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Supreme Court of the United States

October Term, 1933.

No. 440

BENJAMIN F. LINDHEIMER, and Others, constituting the Illinois Commerce Commission of the State of Illinois; OTTO KERNER, Attorney General of the State of Illinois, and the CITY OF CHICAGO,

Appellants,

vs.

ILLINOIS BELL TELEPHONE COMPANY,

Appellee.

BRIEF FOR THE STATE OF MICHIGAN, AS AMICUS CURIAE.

PATRICK H. O'BRIEN,
Attorney General, State of Michigan.

HAROLD GOODMAN,
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Validity of contentions similar to plaintiff's is involved in rate cases pending before the United States District Court in Michigan, and the Michigan Public Utilities Commission; and a decision in favor of the company here would establish precedents adverse to the interest of the State of Michigan.

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In a computation of profits the value of existing agreements for future income should be capitalized and considered in the reckoning.

Essential to a determination of Bell business profits is a purview of the entire enterprise, and a division of costs and values among the various activities. We shall submit an exposition of the general principles governing such divisions, applicable to all apportionments of common expenses and values among different activities.

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As respects railroads, interstate and intrastate transactions are so related that the government of one, in effect, involves the control of the other. Houston, East and West Texas Railway Co. v. United States, 234 U. S. 342 (1914); Act to Regulate Commerce, Secs. 13 (3), (4), and Sec. 15a (U. S. C., Title 49, Secs. 13 (3), (4), 15a; Railroad Commission of Wisconsin v. Chicago, Burlington & Quincy Railroad Co., 257 U. S. 563 (1922); New York v. United States, 257 U. S. 591 (1922); Illinois Central Railroad Co. v. Public Utilities Commission, 245 U. S. 493 (1918); Board of Railroad Commissioners of North Dakota v. Great Northern Railway Co., 281 U. S. 412 (1930); Florida v. United States, 282 U. S. 194 (1931); Louisiana Public Service Commission v. Texas & New Orleans Railroad Company, 284 U. S. 125 (1931).

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The authorities are collected in D. Phillip Locklin, "The Literature of Railroad Rate Theory," 47 Quarterly Journal of Economics. See also Vanderblue & Burgess, "Railroads," Ch. VII; Olmstead, "Do 'Cost of Transportation' Exhibits In Railroad Rate Cases Show Cost" 23 Annals of Amer. Acad. 274; R. T. Bye, "Composite Demand and Joint Supply In Relation to Public Utility Rates." 44 Quarterly Journal of Economics, 40.

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Telephone plant is designed with margins of capacity in excess of immediate needs in the expectation of growth in numbers of customers and the extent of use.

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Under proper accounting, expenditures for attaching customers and training employees would be equitably distributed over numerous accounting periods. Such costs do not procure permanent assets. Even if the disbursements of any year are capital costs, still they may measure approximately the expense of the year.

It is improper to seek rates based upon the allowance of such items as expenses, and then to seek to add them to capital value.

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Present values based on reproduction costs was put forth as a remedy for this condition. It cannot be applied under present conditions, since the value of stocks of goods on the market is not involved.

A proper reproduction cost of specially manufactured goods today cannot be ascertained without designation of the quantities to be produced.

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ILLINOIS BELL TELEPHONE COMPANY,

Appellees.

BRIEF FOR THE STATE OF MICHIGAN, AS AMICUS CURIAE.

The Interest of the State of Michigan in the Controversy.

The Michigan Bell Telephone Company, whose service facilities extend substantially throughout the State of Michigan, is at present maintaining a suit in the United States District Court for the Eastern District of Michigan, the object of which is to have existing rates, statewide in scope, declared invalid as confiscatory of its property. The issues are substantially the same as those involved in the present case, except for the obvious dif-

ference in the properties involved, and the fact that no injunction has been had restraining the operation of existing rate orders. There are, however, marked differences in the manner in which the plaintiffs' contentions are resisted.

At the present time, proceedings on the part of the plaintiff in the Michigan case have been stayed until the plaintiff shall have complied with all orders of the Michigan Public Utilities Commission requiring the production before it of proofs of the cost to the American Telephone and Telegraph Company and to the Western Electric Company, Incorporated, of furnishing goods and services to the plaintiff, and until the plaintiff has otherwise exhausted its remedies before the Commission in conformity with all legal requirements.

On October 30, 1933, the Michigan Bell Telephone Company presented to the Commission as its showing upon the above mentioned matters the identical evidence relative to the American Telephone and Telegraph Company, Western Electric Company, Incorporated, and their subsidiaries as is contained in this record. The plaintiffs' claim of confiscation, in other respects, is supported by theories of valuation, of depreciation, of annual depreciation expense, of going value, and of the proper rate of return identical with those urged in the present case. In respect to the countervailing theories upon these subjects urged by the defendants in the respective cases, there is a marked difference.

As a practical matter the decision of this Court not only upon matters of law, but also of fact, will be followed and applied in the telephone cases in Michigan. It is therefore a matter of importance to the State of Michigan to prevent precedents adverse to our contentions

on both matters of law and fact from being established by the decision and opinion in the present case. To sustain the contentions of the plaintiff will, regardless of legal theory, have the practical effect of repudiating all claims inconsistent therewith, whether or not they have been actually litigated here. On the other hand, a similar result might likewise be accomplished if, in sustaining some of the defendant's contentions, a limitation upon what the public could justly claim should appear to be imposed. A greater degree of confiscation is claimed in respect to the Michigan case; and the application of accountancy principles which, in the Chicago case, would avoid the charge of confiscation, might not be broad enough to have a like effect in the Michigan controversy. This is especially true in respect to the subjects of the separation of properties as between interstate and intrastate uses, fair value, depreciation expense, going value, and the rate of return.

The approach which we make to the problems involved is distinctive. We therefore submit to the Court a statement of the general principles for which we contend, to the end that, should any of them seem to possess merit in any degree, they may find such application and be subject to such further investigation as they may merit.

I.

THE MEASURE OF PROFIT

1. Bookkeeping Liquidations of Net Income Not to be Identified with Profit.

Two main reasons exist why the bookkeeping records depended upon by the company to show profits fail of this purpose. First, the records themselves are not cal-

culated to show all of the increase in wealth proper to the enterprise, and, secondly, the subsidiary entries composing the record, except for the statement of cash receipts and disbursements, consist of liquidations and valuations which are matters of opinion rather than of fact.

The net income shown by books is to be distinguished from profit. Gain in wealth is not solely accomplished by the realization of profits on sales; and to deduct the expense from the annual gross revenues is only to arrive at the net income, which is to be distinguished from profit. Apart from sales at a profit, increase may be secured in the form of capital gains. The stock of capital goods may, during the accounting period, have become enlarged. Inventories may have been greatly increased. Investments may have appreciated. Such elements of gain, the consideration of which is necessary in the ascertainments of profits, are excluded by a regard solely for gains realized through current revenues.

Moreover, the very statement of net income itself as shown by the books is always subject to revision. While the receipts are known, the expenses are not. The latter element represents value consumption at cost during the accounting period, and it includes many items not of fact but of opinion. Disbursements made for services or goods completely used up during the accounting period are unquestionably expenses thereof, but many disbursements charged to current expense have a more general effect. The value consumption of previously acquired capital goods is always difficult to estimate. Whether certain expenditures are to be charged wholly to expense, and how much of past expenditures shall be considered as expense, present problems which are not at all settled by the bookkeeping entries.

2. The Test of Profit.

The complete outcome of an investment is not indicated by the amount of revenues received during an accounting period, less the more or less arbitrary liquidations of expense. Until the enterprise is completely liquidated, it is impossible to determine, in an absolutely definite sense, the amount of profit. At that time, all of the wealth at any time contained within the enterprise has rendered up its benefits in terms of money income. The total gross income then is all-inclusive; and it is only necessary, in order to ascertain profits, to deduct therefrom the outlays of money or moneys' worth which have, in fact, been committed to the enterprise. The difference between income and outlay, when the former exceeds the latter, is profit. In the sense here used, "income" has a somewhat different meaning from that usually given to it in accountancy parlance. It comprises what has been rendered up by the enterprise to its owners. "Outlay", as here used, means the amount of wealth contributed to the enterprise by its proprietors. It is what they have invested as a matter of fact, as distinguished from subsequent revaluations of what the proprietary interest may be worth.

When it is desired to measure profit earned in an enterprise at any time before liquidation, difficulties are at once encountered. The enterprise has rendered money to its proprietors, but still retains, locked within it, wealth in the form of property, the value of which is necessarily indefinite. Nevertheless, in order to calculate profit this value must be arrived at and applied like a liquidating figure. A calculation of profit to date in a going business is necessarily tentative, for while past outlay and income are definite enough, the remaining wealth is measured by an appraisement relative to the conditions of the time.

Any bookkeeping liquidation of profits implicitly makes an assumption concerning the value of the remaining assets. If I engage in the drayage business with a truck costing me $1,000 and I find myself at the end of the year with my truck and $500 in hand, I cannot compute my profit unless I make an estimate of what the truck may be worth to me. Now the bookkeeper may allocate $200 of income to a reserve for depreciation. If, however, his figures are used as a measure of the depreciation expense, in effect he is revaluing the truck at $800. But, as everybody knows, the charges to the expense of depreciation and the credits to a depreciation reserve do not closely measure the actual expense of depreciation or consumption of wealth during the accounting period. They indicate a profit of $300. However, this particular truck may have received such maintenance out of revenues that its value decline may be estimated fairly at $100. The owner justly considers that he has gained a profit of $400 from the enterprise.

Profit must be measured in relation to a standard of reference. We are concerned here with measuring the increase of wealth which results to the proprietary interest in the enterprise. If it is desired to know the profit earned by an individual in his business operation, the basic starting point is his outlay—the amount of money or money's worth which he has consigned to the enterprise. Under the corporate form of ownership, the actual payment made by stockholders for their stock is not comparable to the outlays of the individual in his enterprise, since an expenditure to purchase shares of stock already issued and in the hands of a third party does not constitute investment in the enterprise. The outlay comparable to the individual's investment is that made to the corporation upon the original issuance of its stock. The gains flowing

to stockholders over and above the amount of the sums committed to the enterprise are profits.

Bondholders and other creditors are not ordinarily to be considered as holders of a proprietary interest. In the absence of special circumstances, their contributions of wealth made to the enterprise have an ascertainable cost in the form of interest payments which come out of the enterprise. The gains over this cost, earned through the conduct of business, inure to the stockholders. The liabilities of the enterprise to such creditors simply diminishes the equity of stockholders in the existing assets. However, the reality as a cost of interest payments between related corporations is open to scrutiny. What may seem to be a cost of the payer may contain profit to the receiver.

It may be desirable to determine profits earned within a time more limited than from the inception of the business; and to do so, it will be necessary to take as a basis the proprietary value of the enterprise at the desired starting point. If gains realized in the remote past were to be considered as immaterial in a determination of reasonable profits for present purposes, it is only necessary to move up the time point of reference. Suppose, for example, that the profit earned since 1910 should alone be considered as material. In the first place, it will become necessary to measure the value of the proprietary interest at that date; and this would be the value of the assets in the enterprise less its liabilities,—in short, the value of the stockholders' equity. Next, the amount of profit subsequently earned may be ascertained by adding together the dividends received and the present value of the stockholders' equity, and deducting therefrom the initial value.

In a study of profit earned by the proprietorship over a period of time, it is necessary to express the increase in terms of a uniform annual rate.

For purposes of calculation, a rate of profit is identical with a rate of interest; and since it is necessary to consider gain upon gain, it is the compound rate which is material. Increase which is not withdrawn obviously stays in the business and presumably makes its contribution to the production of future increase and income. The most familiar period for compounding is annual; but we may reckon interest as compounded for smaller periods, or even continuously; and it is therefore a necessary part of the rate to state the period of compounding. Thus a rate of profit of 6 per cent will have different meanings depending upon whether compounding is annual, quarterly, a still smaller period, or continuously. The following tabulation will indicate rates at continuous compounding for one year equivalent to the nominal rate:

Continuous Compounding Rate	Equivalent Annual Rate
5.827%	6%
6.766%	7%
7.696%	8%

It is worthy of note that an annual rate of profit in relation to the average assets throughout the year is approximately equivalent to a rate of profit reckoned continuously. If, for example, an 8 per cent rate of profit is desired, it is obtained by a rate of 7.7% in relation to the average assets.

A distinction should be taken between a rate of productivity and the rate of profit with which we are con-

cerned. The rate of profit upon one's outlay or upon the value of one's interest as proprietor is something different from the rate of productivity or increase of wealth under one's control. A high rate of profit may be made by means of a relatively low rate of productivity. The investor or the enterprise may have command over considerable wealth by borrowing at low rates, and may thus be in a position to reap a high rate of profit relative to the actual investment outlay, or the value of the proprietary interest. The ability of a business to obtain the use of money and property at low cost is an important factor in its profit-making power.

We are now in a position to make a general comment upon the evidence offered by the company concerning Western Electric Company profits as contained in Exhibits A-77 to A-84 inclusive, submitted by Mr. Gregory. Putting aside for the moment the validity of the profit figures, we may note that in A-77 profit is related to average investment; and average investment is the cost of plant, merchandise, receivables, and cash, less accounts payable, which, on the average, existed during the accounting period. All of these items, including that of profit, are the result of allocations between Bell and non-Bell business, and the validity of these allocations will be passed for the moment. The defect which we now point out goes to the base to which profit is referred. This base purports to be, subject to the deduction of accounts payable, a kind of value of all existing assets over which the enterprise has control. It is not entirely clear why accounts payable should be deducted. The result is, in a general way, to afford an index of the average productive power of the assets in the business; and that is all. This index is only useful as a kind of control figure, which the management may watch. Taken by itself it is not at

all significant as a rate of profit, and it is extremely unfortunate that it should be confused therewith. For purposes of management control it is of no great significance whether or not the accounts payable are excluded or included, or whether depreciation is or is not deducted, or whether accounts receivable are or are not lumped with the productive assets. It is only necessary that a certain system be followed consistently over a number of years so that comparisons may be made.

There is little point to argument concerning what items should properly comprise the base of "average investment" as the term is used by the company's witnesses. It is impossible to test the reasonableness of any rate of profit made in relation to such a base, except by ascertaining its remunerative character. The percentage relationship of profit to the average investment base so computed is not the index of remuneration. A low rate of profit so computed might result in very handsome remuneration, depending upon what needs to be paid in the way of interest charges for the use of assets which may be made to cluster about an actual outlay or investment in a business. In short, a low earning power of all assets generally, less payables, is not inconsistent with a rate of profit upon proprietorship which a court may deem unreasonably high. It should also be observed that to average all assets, including the profit itself, and to derive a rate of profit in relation thereto, is to approximate a rate at continuous compounding.

Obviously, the important consideration is to determine what must be charged for output in order that the enterprise may meet its costs and afford a sufficient remuneration to proprietorship. The company should have directed its showing of profits to this object. The reason-

ableness of profits involves a consideration of their compensatory character, and this cannot be determined except by indicating concretely what the gains are to the proprietary interest. The court may then exercise judgment as to whether the interest represented thereby is being fairly treated. But to draw the inference of yearly reasonable profits to the proprietary interest from a rate of profit for average assets, less accounts payable, is to assume to know in advance a standard of reasonableness, for the increase of wealth. Such a standard has not yet been discovered.

II.

MAJOR ELEMENTS OF ERROR IN COMPANY'S CALCULATIONS OF WESTERN ELECTRIC PROFITS.

We have pointed out that the company's profit calculations have too narrow a scope for the purpose. We shall now indicate certain arbitrary assumptions contained in the figures themselves which vitiate the conclusions.

1. Allocations Between Bell and Non-Bell Business.

The division of assets, expense, and profits, as between Bell and non-Bell business as carried out on the company's books is entirely arbitrary. In order to demonstrate the inaccuracy thereof, we consider it advisable to expound what we regard as a sound theory of cost and profit distribution as between the several activities of an essentially unit enterprise. This subject requires a separate and extensive treatment, which will be presently set forth.

2. Overstatement of Expense and Understatement of Capital Gains by Excessive Depreciation Expense Charges.

The charges to the expense of depreciation are based upon a special application of the straight line formula. As is well known, this formula does not result in even a substantially accurate determination of value loss, and consequently when used as a term in the calculation of profits it produces results wide of the mark. The subject of depreciation will likewise be made a matter of extensive consideration in this brief. No particular accounting formula can possibly be an accurate measure of depreciation. However, if the validity of certain facts commonly taken for granted be conceded, then the bias in the straight line formula can be measured. Furthermore, the actual test of depreciation is an appraisement which will ascertain the difference in capital value as between prior and subsequent dates. In view of this consideration there is especial efficacy in determining profits by comparing what was put in with what was taken out and what remains. In these figures will be found all values remaining in the business which were accounted for as expense items but which have contributed to the enhancement, in some degree, of capital value.

The cost of small tools and fixtures is charged entirely to the expense of the year in which it is incurred. Accordingly, the actual expense for any particular year is overstated by the remaining value of such tools and fixtures at the end of the year. Taking the matter from a cumulative point of view for the purpose of computing profit over an extensive past period, the remaining value of all such tools and fixtures is an essential item bearing upon the determination of past profit.

Many tools, considerable machinery, and other items are of the company's own production. These are put upon the books at standard cost and thus include loadings for depreciation of plant. This depreciation expense loading, being transferred to the product, becomes an element to appreciate its book cost. Against it, in turn, depreciation is charged. If in general the depreciation expense charges are excessive, the result is a strongly accumulative error which can never be figured out by the use of general expense loadings. It becomes necessary to revalue all remaining goods of company manufacture in order to determine what wealth they represent.

3. Inventory Revaluations.

The book profit of any one year may be made to vary markedly by the method of inventory revaluations at the end of each year. In Western Electric Company, Incorporated, the inventory figures at any time are quite large; for example, for 1929 they averaged $95,940,000 and for 1930 $86,678,000. Obviously, the method of valuing the inventories will greatly affect the measure of profit as shown by the books. It is practically impossible to check past inventory revaluations since the goods are not available to be appraised. However, under the methods which we propose here it is only necessary to get at the wealth represented by the remaining inventory at the end of the study period. If in the past a consistent method of inventory revaluations has been followed, errors would tend to become compensating for a like amount of property. But the amount of the inventory has not been stable. The average inventory has increased upon the company's basis from $33,000,000 in 1916 to $96,000,000 in 1929. The essential question in this regard is how much wealth is represented by the merchandise inventories at the conclusion of our study period.

4. Development Expense.

Development expense always regards economies and profits of the future. Only a trifling amount of development expense goes to enhance the value of output in the year in which such expense is incurred. Development is progressive. Research consistently carried on at considerable expense eventually culminates in discovery. The discovery applied in the arts produces profit actually realized in income as products embodying the development are marketed. To charge development expense as a current expense is, in effect, to conceal profit. The history of the business conclusively shows that plowing and sowing by way of development eventually raises abundant crops. In any computation of profits it becomes necessary to evaluate the wealth represented by unexpired developments and development work in progress. In Western Electric Company, Incorporated, the so-called development expense for the year 1930 was $14,000,000; for the year 1921 it was $11,000,000. Unquestionably the cumulative expenditure of many millions for development over a period of years will produce at the conclusion of our study period existing patents, processes, and projects of very substantial value. This value will eventually be realized by and through products which will be marketed in the future. Developments in the field of sound and visual transmission may permit, if past experience is any indication, the accumulation of tremendous profits which may be classified as non-Bell. The cost of the basic developments upon which the commercial application is superimposed is borne as a part of the Bell business. The point here made is applicable not only to Western Electric Company but to the Department of Development and Research in the American Company and to Bell Telephone Laboratories.

5. Employees' Pensions and Benefits.

The expense of employee's pensions, disability and death benefits, presents a problem of some difficulty. Our discussion at this point will refer to Western Electric Company as typical. The complicating feature in the determination of this expense arises out of the fact that a so-called fund in the hands of a trustee is created and maintained. The creation and maintenance of this fund is, in reality, a fiction amounting only to a bookkeeping transaction. The trustee is required to accept the direction of the company concerning the investment of the fund, and the company directs him to lend it to Western Electric Company upon the latter's notes at 5½ per cent interest per annum.

The company seeks to justify charges to expense measured by the amount of principal contributions to the pension fund upon the theory that a fund accumulating at 4 per cent compounded semi-annually will at any time have a magnitude equal to the present worth of all benefits prospectively payable, if the amount of such benefits, when paid, be discounted at the same rate. Briefly stated, the rate of 4 per cent compounded semi-annually is arbitrarily taken as a valuation factor to measure what the contributions to the fund should be and what its amount should be at any time.

Why select a 4 percent rate at semi-annual compounding (equivalent to 4.04% annually)? Nothing other than habit, convention and analogy dictates this selection. (See testimony of Arthur Hunter.) There is no explanation whatever of the true function performed by a rate of interest and hence no proof in support of it, other than the analogy of customary actuarial calculations,

which are totally without significance with respect to the case in hand.

Disregarding the fiction of the fund and the trustee, the Western Electric Company is seen merely to undertake to pay the pensions and benefits which are described.

The actual cost to the company consists in the disbursements made to beneficiaries and to pensioners. The question to be here considered is, what is the equitable distribution of this cost to the several accounting periods.

The determination of such an equitable distribution is necessary because the actual disbursements are not equal annual amounts and ought not to be chargeable exclusively as expenses of the accounting period in which they occur. The distribution of unequal expenses will be later treated in some detail in connection with our exposition of depreciation.

At this point, however, we may state the result without the elaborate probative detail. The assets to cover such anticipated disbursements are kept invested in the business. We may call the amount thereof the employees' equity for purposes of calculation. The wealth represented by the interest of the owners and the provision for employees earns at a certain rate, and when the earnings are left in the business the increase proceeds by compounding. What is the rate of profit as to the combined equity of the owners and employees? This rate, applied instead of 4.04 per cent, as done by the company, will measure the amount of assets at any time which should on the books be allocated to the reserve for pensions. This reserve balance remains in the business and earns profit. To credit the pension fund merely with interest at some arbitrary figure, as, for example, 5½ per cent, the rate which Western pays upon its borrowings

from the pension fund, is simply to fix arbitrarily upon a rate of earning power for a certain proportion of assets devoted to the business.

The proper factor to use to distribute the pension fund expense and to ascertain the reserve requirement is the rate of profit being earned upon the equity of the owners, plus that of the beneficiaries and pensioners. The reserve requirement is the present worth of the pension and benefit liabilities, at the rate of profit.

We have already indicated that the company's exhibits are calculated to show not the actual profits and the actual rate of profit on investments or on the value of the proprietary interest, but rather the rate of merely book profit related to average assets less current payables. Entering into the operating expenses are the principal contributions to the pension fund, too high because of the use of a rate of interest lower than the rate of profit. Entering into the average assets is the cost of such goods paid for out of borrowings from the pension fund. Diminishing the profit and swelling the asset base, make a high rate of profit look like a small one. Interest payments to the pension fund are excluded from consideration in the exhibits. Even if the fiction of borrowing and paying interest is followed, the rate of profit on the owner's equity is increased whenever the use of assets may be had at rates below the rate of earning. But the principal and interest payments are form and not substance. The benefits are paid out of the business, and any money's worth of assets nominally allocated in the books as provision to meet them gains compound accretion in value according to the actual rate of earning.

If an insurance company calculates its reserve requirement upon a 3 or 3½ per cent basis, it does so out of con-

servatism with regard to the character of its investments. It allocates an amount to the reserve which is clearly sufficient for the purpose, and what it has left over and above this amount may clearly be considered its surplus or profit. Its investments are supposedly conservative and their average earning power might not tremendously exceed the factor used in calculating the requirement for reserves. As applied to an actual business having higher earning power where the liability is assumed by the enterprise and not through insurance separately carried, the factor for distributing the benefit and pension disbursements as expense over the various accounting periods must be the actual rate of earning and not some assumed and imaginary safe rate of compounding.

A serious question may be raised as to whether the experience up to 1931 relative to continuance in employment is a safe basis upon which to ascertain prospective liability for benefit and pension funds. Such figures cannot include consideration of the major recession of business which reached its low point in the early part of 1933. It is safe to say that the number of employees prospectively eligible for benefits and pensions has greatly declined, in comparison with the figures used by Mr. Hunter.

6. Exclusion of Investments, Profits in Subsidiaries, and Profits Derived by Special Contracts.

The formation of separate corporations for the purpose of exploiting commercial opportunities in fields apart from the Bell System makes it possible to present the appearance of profit realized in such businesses wholly exclusive of dependence upon the Bell System. But if, in fact, the commercial possibilities exploited through subsidiaries and through activities apparently non-Bell, exist only through

the inextricably intermingled activities of an essentially unit business, then the gains allocated to investments merely through the forms of separate organization and of accounting are subject to revision and re-allocation. Every activity dominated by the American Telephone and Telegraph Company is financed out of a common pot. The American Company has made not merely telephony but the entire field of wire and wireless, sound, and visual transmission a subject of research and commercial exploitation, not only through offering communication services directly, but also through the manufacturing and selling of various appliances, the acquisition of patents and the licensing of their use. Developments of use in non-Bell fields arise out of researches in the general field. Before application of a scientific principle can be made, the principle itself must be discovered; and when such research, conducted ostensibly to foster the telephone business, forms the basis of non-telephonic developments, it cannot be said that the latter have an economic standing wholly independent of that business whose financial power and unity of purpose brought them forth. To credit the profits made from these developments to non-Bell activities is to fail to account for the value of services produced by and through the telephone business. To charge to the development merely certain costs accrued after the project became recognized as commercial as distinct from telephonic is, in effect, to shunt the cream into a separate reservoir without considering the fact that the ultimate revenue derived is in reality a joint product of the business as a whole, primarily existing for, and supported by, subscribers for telephone service.

In the brief presented below by the appellants, elaborate studies were made showing, in definite arithmetic, the

fact that the major expenditures for development seemed to have first and primary application with the Long Lines department of the American Telephone and Telegraph Company and with Western Electric as the manufacturing department. It was pointed out in illuminating detail that though the costs were ultimately charged against the local telephone subscriber in large degree, the benefits were realized in the form of disproportionate profits through Western Electric and through the Long Lines. Since we anticipate that this subject will be fully detailed in the appellant's brief, we refrain from repeating it here. Moreover, our object is primarily to urge principles for interpreting the facts, rather than the detail of the facts themselves. We shall therefore principally expound the manner in which we contend by-product or joint product revenues should be accounted for. Such revenues, taken together with the Bell receipts, are all-inclusive. They include not merely the dividends paid by subsidiaries to the parent corporation, but the actual gains realized in income or through capital value appreciation in the subsidiaries. There are other methods of drawing out profits and classifying them as non-Bell or non-operating, besides the device of realizing gains in subsidiaries. Among those are sales of companies and of assets, and the making of contracts and licensing agreements which, since they provide for future revenues, have a value which should properly be capitalized. Indeed, such items must be carefully scrutinized and valued before any determination of profits may be had."

We shall cite as typical two examples out of many. The first is the $4,000,000 payment known as the Automatic transaction (X-360, X-361); the second is the leasing agreements for Western Electric sound equipment between Electrical Research Products, Incorporated, and theaters.

The Automatic transaction, consisting of payments to aggregate $4,000,000 by 1936, is in effect a rebate to this extent of the prices which Automatic charges Western for goods which Western purchases of it. The company explains this transaction as compensation for Western's releasing an option to buy out Automatic. But the basis of any transaction between the two companies, including the option itself, consists in the fact that the companies have maintained commercial relationships founded upon the supplying of equipment to the Bell System. Indeed, it appears that Automatic has patents and manufacturing facilities of use to the Bell System. The transaction, reduced to simplest terms, is that Western gives Automatic business, paying therefor certain prices, and Automatic rebates $4,000,000, not directly but to a wholly owned subsidiary. But regardless of this fact, the $4,000,000 of revenue arises as a product or by-product of the telephone business. It is not sensible to say that this receipt or any other single item of revenue is achieved by means of a speculative stroke wholly apart from the business in general. Any successful enterprise tends to develop advantages apart from the mere sale of its products. Any special investment opportunity which may arise is necessarily reached from the foundation of the enterprise itself and is just as much a part of the gains flowing to the enterprise as is the revenue realized from marketing the primary product. Now, instead of attempting to distinguish by meticulous argument how much of each particular transaction is Bell or non-Bell in nature, it is necessary to lump together the total value of all of the assets in the enterprise including all investments in subsidiaries, or in stocks, bonds and real estate, and all deferred revenue items incorporated or represented by contracts and licenses, and also the value of all com-

pleted development projects in the form of patents and all projects in work. It will be found that without carrying these valuations to completion, or changing minimum valuations upon the items of somewhat indefinite value, the profits realized in the Bell System and the gains properly to be allocated to any single company are of such magnitude that regulations like those of Illinois or of Michigan are fully absolved of the charge of being confiscatory.

In a like manner it should be noticed that Western Electric sound equipment for use in the motion picture theater business is leased under ten-year installment contracts to the theaters. The gains to be realized, produced fundamentally from developments appertaining to the Bell System business, are not shown in any computation of profits produced by the company. The showing of Electrical Research Products', Incorporated, profits is limited to that derived from income actually realized. But a capital gain of immense significance is acquired upon the making of each contract. The expected income from such contracts may even be heavily discounted in the process of capitalizing it, on account of possible risks of non-realization, and still the capital gains thus revealed will have a substantial effect in a calculation of profits.

The foregoing six points indicate generally the insufficiency of the company's showing concerning profits, specifically Western Electric Company's profits. Profits must of necessity be measured through a purview which shall be inclusive of all gains, regardless of the activity in which they are apparently accrued, and of the form in which they exist, be they income or capital gains. It will be unnecessary for our purposes to enter into any detailed analysis of the claims made by the company

concerning the costs of rendering the license contract services. The principles to be applied in ascertaining profits will dispose of such claims. The major problem in determining the cost of conducting the Bell business lies in ascertaining the method under which costs or property values are to be divided between, say, the Associated Companies on the one hand and the American Company on the other, or between Bell and non-Bell activities. This problem is created because services of persons and of property have a common or intermingled reference to both activities. We are profoundly persuaded that the attempts to allocate the cost or value of such services between different uses made in this case are entirely erroneous. We believe further that there is a common principle for the distribution of costs or values between uses which will have application to all aspects of the problem, including that of dividing the value of property between interstate and intrastate uses. We desire, therefore, to show the nature of the problem itself, the fallacies which are encountered when an attempt is made to split joint costs or the value of jointly used property upon the basis of a physical standard of measurement like, for example, time of use; and finally, that the true principle of cost or value distribution must ultimately depend upon the value of the benefits derived out of each of the joint activities, and that this value of service basis for such allocations may be discovered and applied consistently with legal principles of fair value and rate determination, a proposition which in the past has engendered some doubt.

III.

THE APPORTIONMENT OF COSTS AND VALUES BETWEEN JOINT USES.

1. The Business Here Under Consideration an Example of Joint Production at Common Costs.

The business of the American Telephone & Telegraph Company is concerned with exploiting the commercial opportunities for sound and visual transmission. Primarily engaged in communication by telephone, the enterprise includes besides telephone operating companies, a manufacturing department, selling organizations to market various commercial products, and a research department. The business is so integrated that its subdivisions are only the necessary functioning parts of a whole. The financial resources of the entire business are available to any department at the discretion of a central management. The same management likewise determines the scope and extent of development study and whether commercial opportunities shall be exploited.

A large part of the total cost of doing business in this enterprise is incurred for the services of persons and goods which will have distributive effect upon the business in general through its various activities. Indeed, all of the various classes of output of the business regarded as a unit, whether telephone service, manufactured goods, the rental of talking picture apparatus to theaters, and so on to every product, have a substantial element of common cost. The community thus existing may be likened to a tree and its branches, in which the trunk sustains the branches, twigs, and leaves, and through them is in turn reciprocally nurtured.

In a word, the business here under consideration in all of its phases is subject to the condition and circumstance of joint production. We use this term in a broad sense without narrow limitation upon its meaning. It has been restricted to apply to cases in which the production of a certain commodity is necessarily or practically accompanied by output of companion products, like cotton and cotton seed, meat and hides, gas and coke, etc. Such a fine distinction and definition is not of importance for our purposes, and we may apply the term to the case here emphasized in which costs have a distributed effect over several products.

2. Joint Production Determined by Value Difference in the Unit of Output.

The problem of distributing a common cost will arise whenever there is economic distinction in the units of output. Such distinction is not excluded by physical identity. For example, kilowatts of electrical energy, though physically identical, may have different uses and therefore sell at different prices. They are thus subject to classification as if different in nature. Of course, the difference is economic, and it is evidenced by a difference in selling price, that is, value difference to the customer. Upon reflection it will be seen that value differences in output having a common source represents the general rule. It is indeed a rare case in which all of the output consistently sells at the same price per unit. The railroad business will present striking differences in the value of transportation, depending upon what is being transported and the economic value of the transportation service. And the same is true of the telephone business.

In the same way, a facility common to the production of intrastate and interstate services may be regarded as a source of joint products. The types of services so classi-

fied may be of different economic value, unless, indeed, a consistently administered policy of regulation fixes an identical price per unit of service. The telephone business, which is not, and cannot be made, subject to regulation providing a uniform price per unit of service, represents an excellent example in which intrastate and interstate services are jointly produced by the same facilities and constitute distinctive output because use, application, and value are different.

3. Scope and Usefulness of Correct Principle of Cost Distribution.

A valid general principle for distributing common costs to joint products will have far-reaching application to the numerous problems involved in this case. It will serve to divide and to apportion the general development costs, common manufacturing costs, and the common cost of management supervision, as well as to make apportionments in the value of property as between interstate and intrastate uses. It will likewise serve to apportion the value of property used in common for exchange and toll purposes. However, it may be said at the outset that a demand for the kind of division conventionally sought cannot be satisfied, and it is a part of the solution which we here propound to demonstrate that this demand is totally incapable of fulfillment.

4. Criticism of Prevalent Ideas of Cost.

The conventional approach to this subject, which, we may add, has achieved absolutely nothing by way of solution[1], is grounded upon a verbal formula. It imagines

[1] "Every attempt to figure out the total expenses of a given item of traffic, or a given group of items has failed."—F. W. Taussig, "The Theory of Railroad Rates Once More," 47 Quart. Jour. Ec. 337 (1933).

that what may be expressed in words has an objective existence. We may talk glibly and with assurance concerning the cost of rendering a particular service, but if the verbal expression or mental concept does not correspond to anything in reality, the talk is futile and its syllogistic results are empty. Let us examine the nature and meaning of cost for a moment.

Cost is a word of loose definition having extensive reference depending upon the context. The common knowledge and understanding of its meaning are founded upon the simple transactions of barter and sale which comprise everyday experience. Ordinarily, items are separately bought for a definite price; and what one pays or sacrifices for an article is termed its cost. An article for retail sale will usually have a price tag upon it, which represents the cost to the purchaser. The purchaser naively assumes that somewhat similar price tags extend back through the course of production, and that the article has a separable cost to the retailer, and in turn has a separable cost to the wholesaler or producer. He assumes that the article, as made available to him, or each element comprising it, has a distinct, separate cost.

The condition of simplicity in which a sacrifice finds a defined and liquidated relationship to the object is relatively infrequent. The retailer's costs are not limited to what he has to pay directly for his goods; and to ask him for a complete statement of what a particular item of merchandise costs him is, if he interprets the question as not limited merely to what the purchase price of the article was to him, to pose a conundrum. In order to place a particular item on his shelves for sale, the retailer has made numerous sacrifices, most of which were incurred for all goods in common. For example, he has rented and

equipped a shop, he has developed and nurtured a trade, expended money for advertising, maintained a proper staff throughout periods of good and bad business, incurred general expenses for the purpose of keeping his buyers and managers informed of market and trade conditions, and he has stocked his shop with a variety of merchandise so as to facilitate the sale of any one item. To ask the question, therefore, as to what the item costs, meaning to include all of the sacrifices of money or money's worth made to render the article deliverable to the customer, is to demand the production of something which does not exist in the form sought. There is no objectively occuring or existing cost having complete and exclusive reference to the object. We cannot ascertain what was paid to render it in salable condition for the very obvious reason that substantial payments were made for services in gross which have a general effect upon this and presumably all other items.

It then becomes a matter of accountancy art to make an apportionment of such general costs and to propound a figure which may, for accounting purposes, be taken as the cost of any single item. The figure thus propounded is not a real cost. It is not, as a matter of fact and event, the actual measure of the sacrifice made for the object. It embodies a distribution of composite costs, the validity of which must be justified by some principle of distribution as will stamp it as fair for the purpose used.

5. Example of Common Cost Distribution to Joint Products.

We shall now turn to a simple example of joint production, selected to involve the joint production of numerous items identically the same but subject to some economic differences. The example provides illustration of complicated facts under most simple conditions.

A concern engaged in the business of court reporting has the opportunity to sell transcripts of certain proceedings. We shall assume that the labor cost will be $100, whether one or ten transcripts are made; and that the material cost will be $1 per copy. Each of the two parties will purchase a transcript at $50. Eight others, having a minor interest in the case, will spend $5 each for a copy. Upon this basis the reporters are willing to undertake the work, because there is visible a profit of $30, since the total revenue will be $140, at a total cost of $110. A proportion of this cost and profit is allocated to each of the customers.

It is simple enough to compute the average cost of each transcript at $11. However, it is erroneous to allocate the sum of $11 as the expense of each. To do so is to assume that each customer has received an equal worth of service. As we have indicated, it does not follow that because each transcript is physically identical, its value as a service is also identical. If each transcript were to bear a cost burden of $11, the reporters will appear to lose $6 each on the customers who purchase the $5 copies. If they depended upon such figures, they would be misled. The process of averaging in this case simply eliminates the distinctive elements which themselves are the bases for the solution of the allocation problem.

Another view, equally erroneous, is that since the major purpose of the work was to furnish each of the parties with a transcript, the other eight are really by-products. Since the extra cost of making the other eight is only $1 each, under this view, it would be said that the expense chargeable to the by-products is only this amount. But it would then appear that a loss of $1 each is incurred on the $50 customers, while a profit of $4 each is made on

those who buy the other eight. The idea that by-product revenues are gratuitous windfalls and should bear no expense burden is wholly untenable.

In accounting for the cost of the transcripts, and in tracing the same into the expense chargeable to each, it is obvious that in each case the expenditure for material is a direct service to the product. Only the joint service, that is to say, the labor expense, which has gone over into the product needs to be apportioned. Traceable to the labor, there is a total income of $130, of which 49 parts are allocable to each of the $50 customers, and 4 parts to each of the $5 customers. Therefore 49/130 of the total labor cost must be allocated to each of the transcripts sold to the parties, and 4/130 to each of the others. As a result, $37.69 represents the portion of common expense allocable in respect to each of the two major transcripts, whereas but $3.08 are assignable as such expense to the others.

It will be obvious that in the foregoing example the joint expense is allocated in accordance with the appreciation which it causes in the product. This is indeed the value of the services procured by such joint expense. Suppose that a certain commodity when delivered to a distant point is enhanced in value by, say, $100 because the buyer is willing to pay the nominal transportation charge amounting to $100. Now suppose that upon the truck carrying the primary article another box of equal weight and dimensions can be loaded, the value of which will be enhanced at the point of delivery by only $10. The same truck hire of $100 will serve to carry both. The $100 of expense is a joint service to both commodities and it appreciates their value by $110. The appreciation of the primary article is 10/11 of the total; that of the second

article is 1/11 of the total. Therefore, the joint expense of $100 is to be allocated in the same proportion. As a result, the transportation expense applicable to the primary item is $91.91 and that applicable to the secondary item is $9.09.

Allocations of joint expense in accordance with the value of the service must be distinguished from the gross revenue method. The value of the service does not refer to the selling price of the commodity worked upon, but rather to the appreciation in value caused by the joint expense. A still greater appreciation in each commodity may be caused by the services of separate or direct expenses. In the absence of any direct expense, the joint expense will obviously be apportioned in accordance with the value of the product.

Let us examine the example of the transcripts from the profit aspect.

In the first place, we may note the special advantage which constituted the source of the profit. It consisted in having the labor opportunity; and this advantage was worth $30. No special profit opportunity lay in having the paper; it inhered in having the job. Now the profit opportunity relates to the entire project, and it gets its force and value from the demands of the ten customers as a whole. The demand of any one customer without that of the other nine has no significance. In essential aspect, the opportunity may be described as that of getting $130 at a labor cost of $100. The labor services permeate all the products compositely. It is not the case that so many units are expended upon one transcript and so many upon another, for each unit of labor, or dollar's worth of service, extends to all. It is therefore fair to say that each dollar sacrificed for labor was equally effective in

procuring the benefit. In short, each dollar of cost may be correlated with $1.30 of income. The profit is therefore 30 per cent upon the cost, and this is equivalent to 23.08 per cent upon the income. An appropriate disposition of each income dollar is 23.08 per cent to profit, and 76.92 per cent to cost recoupment. Accordingly, we may conclude that, where it appears that the income is a composite result of a certain cost, it follows that to each dollar of cost an equal profit making potency must be accorded.

6. Relation Between Cost and Price.

A necessary interdependence exists between the price actually or properly to be charged for the product and the distribution of costs, so that as a result each dollar's worth of property jointly used or each dollar of joint expense will have the same profit-making power. As we have seen, the cost apportionment is not in accordance with the gross revenues or the selling price of the products, since compensation for the direct costs which may exist in any magnitude will be included in the price, and will cause individual variation. The remaining income after compensation for direct services has been deducted is alone attributable to the joint production. In order to apportion common costs, it is necessary to know in advance at least the relative contribution of each product to the total requirement for joint cost compensation. How, then, is the division herein suggested and the principle upon which it is based of any help in the regulation of public utility rates?

The assumption is frequently made that a fair price for a particular service must necessarily be determined by first finding the cost thereof. The proposition that cost

ascertainment is a logically necessary premise to price determination in public utility rates is utterly fallacious. It must be conceded that no independent cost exists and that a general cost must be divided according to some standard. It is thought that a common physical unit may be found—a unit of use—which will serve as a basis for dividing the common costs, so that from the division thus made there may be inferred the minimum income requirement per unit of service. Unfortunately this procedure does not logically advance the course of thought. *It contains the underlying assumption that each such identical physical unit of service must, as a minimum proposition, command the same income.* Thus the very reasoning leads into the pit which it was designed to avoid. The rule of cost distribution advocated is simultaneously a doctrine of price regulation. It says plainly and necessarily that unless there is at least compensation per unit of service in all activities equal to the minimum standard, then the rate below this standard is confiscatory. As applied to the example of the transcripts such a rule necessarily makes each cost $11.

The proper relationship between cost and price in a regulated business may now be stated. In respect to jointly used facilities there exists no separate cost of each use, and there likewise exists no separate cost for each unit of use no matter to what extent the refinement of units may be carried. The general cost, however, is a positive fact, and the object of that cost is the total output. Remuneration for the cost must be found in the total output; and this statement exhausts the usefulness of determining price from cost in this instance. We are enabled, therefore, to use such general cost only for the purpose of imposing a limit upon the total price which may be demanded, that is, as a basis for limiting total

revenues. In the same way it may also be said that each service must afford compensation for its direct costs and make at least a substantial contribution toward providing compensation for common costs.

7. Importance of Relative Value of Different Services Obtained at a Common Cost.

Having thus exhausted the efficacy of cost in rate determination, it becomes necessary to seek for another and different factor upon the basis of which the precise contribution of each service toward making up the total income requirement may be established. This factor, referred to as the relative value of the service, is the result of interaction between the facts of demand and the conditions of supply, and is not ordinarly susceptible to exact calculation. Experience and practice will offer better precepts in the composition of a differential rate structure than theory and mathematical formula. General principles, however, may be indicated. The interest of the utility is adequately protected if revenues as a whole are compensatory. The distribution of services should be such as will bring in the total revenue requirement and will subject the facilities to the most advantageous exploitation in the interest of the public. This is, indeed, the fundamental object of rate regulation. When due regard is had for the value of service to the customer and prices are adjusted so as to facilitate a more complete use of the facilities, compensatory revenues are secured more easily and with greater certainty and the services are distributed in the most desirable fashion from the public point of view.

8. Property Value Division Proceeds on Same Basis as Common Cost Apportionment.

The principles of allocation which we have described in connection with the distribution of expense are equally applicable to the apportionment of property values as between different classes of service. However, the division of expense in accordance with the value of its services to the products, discerned in its relative appreciating facts, is more simple because we are immediately confronted with the output, whereas the output of capital goods is extended over a considerable time period. In this time factor lies the special problems of capital value accountancy. Its complications may be perceived if there is visualized several streams of output extended in time in which the volume is subject to continuous and disproportionate fluctuations. These elements, when they exist—and their existence is the general rule rather than the exception—are to be considered in the practical applications of valuation science and in the accountancy of values by reason of different uses. But for the sake of keeping the subject in elementary terms, let us by means of an assumption concerning the facts, eliminate these special complications. Let us assume that the relative value of any time portion of the several output streams is always constant; that is to say, that the value of any one service for every accounting period bears the same relation to the value of all the services. It will then follow that the proportions indicated in the operations of a single accounting period are a perfect sample of all and the division of values made upon this basis will apportion the values of commonly used property as well as the value quantities which have passed out as expense.

It must always be remembered that the subject matter of acountancy is value quantities; and the principle of apportionment herein expounded is applicable to any value quantity no matter how it may be measured or classified. Thus an expense is simply a value quantity used up immediately, or within the current accounting period. A capital value is a value quantity applied to a stock of services, which when not perpetual, may be consumed as expense over protracted accounting periods. Nor will there be any distinction in principle between apportioning costs and dividing values. Distinctions in meaning between cost and value are irrelevant to the present subject. The division of a cost simply means the apportionment of a quantity of value measured at the cost standard. It makes no difference to the principle of apportionment what the value quantity to be divided may be. It may be measured at cost; it may be revalued on some other basis; it may be measured in terms of some arbitrary unit, like "standard cost;" or it may be expressed by an algebraic symbol. The divisions will be a certain proportion of the value quantity regardless of the latter's magnitude.

9. Comment on Judicial Decisions Concerning Property Separation and Division of Powers.

It has apparently been accepted as axiomatic in previous decisions of this court that the cost of particular services rendered by facilities engaged in common activities, for example, intrastate and interstate commerce, could be ascertained independently of the relative value of the different services. We refer to such cases as *Smyth v. Ames*, 169 U. S. 466; *Northern Pacific Railway Co. v. North Dakota*, 236 U. S. 585; *Norfolk and Western Rail-*

way Co. v Conley, 236 U. S. 605; *Minnesota Rate Cases*, 230 U. S. 352; and *Northern Pacific Railway Co. v. Department of Public Works*, 268 U. S. 39. But this court has never asserted a rule of law to govern the division of common costs between the classes of commerce or of traffic, but on the contrary has indicated that such matters are considered to be questions of fact in the particular case. *Groesbeck v. Duluth South Shore Railway Co.*, 250 U. S. 607. Because the fair value of the property may be determined independently of rates and revenues, it does not follow that subsidiary fair values can be ascertained by like methods. The summation of costs, or of present prices, can only be resolved back into the very units—separate costs or prices—which compose it. There is no escape from the proposition that the total fair value of jointly used property must be divided according to judgment as to the proper relative values of the several inherent uses. The attempt to deduce this division from a premise of refined cost analysis, as has been indicated, begs the question itself by imputing equivalence to each unit into which the property or its value is resolved.

In spite of the predilection to infer independent property elements correlative with apparently independent regulative authorities, in legislation and judicial decision it has become recognized that as respects railroads, interstate and intrastate transactions are so related that the government of one, in effect, involved the control of the other. *Houston, East and West Texas Railway Co. v. United States*, 234 U. S. 342, (1914). It is well established that the authority conferred upon the Interstate Commerce Commission to prescribe intrastate rates in place of those found to be unduly discriminatory against persons or localities in interstate commerce, contained in Paragraphs 3 and 4 of Section 13 of the Act to Regulate Commerce, is to be read in connection with the provisions

of Section 15a authorizing the Commission to fix rates which, as a whole, will yield a fair return in view of the value of the property and the transportation needs of the country. *Railroad Commission of Wisconsin v. Chicago, Burlington & Quincy Railroad Co.*, 257 U. S. 563 (1922); *New York v. United States*, 257 U. S. 591 (1922); *Illinois Central Railroad Co. v. Public Utilities Commission*, 245 U. S. 493 (1918); *Board of Railroad Commissioners of North Dakota v. Great Northern Railway Co.*, 281 U. S. 412 (1930); *Florida v. United States*, 282 U. S. 194 (1931); *Louisiana Public Service Commission v. Texas & New Orleans Railroad Company*, 284 U. S. 125 (1931).

10. Views of Economists.

A recent article[1] points out that in the opinion of most economists, cost allocations are unsound in principle when applied as a means of determining rates. To quote therefrom:

> "Most economists are inclined to consider cost allocations as unsound in principle. Hadley stated that an apportionment of costs results in a false and arbitrary return which is worse than none at all.' Taussig said that cost allocations as a basis for fixing or criticizing railway rates were 'useless and indifferent alike for the railway manager and for the student of economics.' G. P. Watkins says: 'All costs certainly can be apportioned. But that fact of itself is no more significant than is the possibility of obtaining an arithmetical average of any fortuitous collection of numbers.' And Philip

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1D. Philip Locklin, "The Literature on Railway Rate Theory," 47 Quarterly Journal of Enonomics 167.

In this article will be found an exhaustive bibliography of the subject. See also Vanderblue & Burgess "Railroads," Ch. VII; Olmstead, "Do 'Cost of Transportation' Exhibits in Railroad Rate Cases Show Costs," 23 Annals of Amer. Acad. 274; R. T. Bye, "Composite Demand and Joint Supply in Relation to Public Utility Rates," 44 Quart. Jour. Ec. 40.

> Cabot, in speaking of cost allocations, says: 'They suffer from an incurable disease, namely, the attempt to divide the indivisible . . . To allocate the costs of a utility is as futile and dangerous as it would be for a butcher to allocate the cost of the different pieces into which he cuts the carcass of a cow.' "

11. Summary of Value Apportionment Between Interstate and Intrastate Uses.

Professor Cabot's comparison between allocating the costs of a utility and a butcher's apportioning the cost of the different pieces into which he cuts the carcass of a cow, is not inappropriate to illustrate the possibilities and functions of such cost acountancy. The butcher could not arrive at a price which he should charge for meat, first by apportioning the total cost of the carcass in accordance with the proportionate weight which the several parts may bear to the whole. He could not rationally assume that any pound of the meat cost him an identical sum. However, he would be entirely rational if he divided the total cost in acordance with the relative values of the parts. In the butcher's trade, it would not be at all difficult to do this. Now a proper principle of accountancy should apply as well to things so incongruous as a cow and a public utility, because the subject matter of accountancy is a quality which they possess in common—a value. The relative value of public utility service is obviously more difficult of ascertainment than that of the various cuts of meat, but these relationships in neither case are derived from cost—except for the general limiting influence of the total cost—but actually emerge as commercial facts dependent upon conditions of demand and supply such as have been explained. In the same way, to divide the value of a business jointly rendering interstate and intrastate services, is properly to regard the

value gravity in respect to each activity as it is related to the whole. The apportionment is not to be made by first inquiring what each part cost, for the reason that the parts as such are not items of separate purchase. The function of cost in measuring contemporaneous values is appropriate only to ascertaining what the object of the cost was worth. Since the facility which furnishes interstate and intrastate service as joint products is entire, the total cost or value must be divided upon the basis of the relative values of the different activities. They cannot be compared in respect to their worth to any tangible objects in existence. Therefore it becomes necessary to have regard for the factors which account for the very existence of the value quantity itself. This is found in the total income which the business as a whole must have if it is going to be worth the particular sum designated as its fair value. Since we are concerned only with dividing the value of composite goods serving a common purpose, our search must be directed toward the income correlative with the value of such goods and must accordingly exclude all such income as is purely correlative with directly applied values or expenses. By charging the gross income of each separate activity with the appropriate amount of direct expense, the balance remaining will constitute the income realized in each activity from the jointly used property. This property has value only by reason of its capacity to produce income. What that income should be is measured by the requirements of compensation if direct expenses are deducted. The several uses are merely contributors to this requirement; and the income to be furnished from each use must depend upon the contribution to the whole which each use ought to make.

For the sake of definiteness, let us set up an example in figures. Suppose that the fair value is $1,000,000; the

gross revenues are $100,000, equally divided between interstate and intrastate business; the direct expense, interstate, is $10,000; the direct expense, intrastate, is $15,000; the joint expense is $15,000; the following tabulation will indicate the manner of division:

	The Intrastate Business	The Interstate Business
Gross Revenues	$50,000	$50,000
Direct Expense	15,000	10,000
Income from jointly used property	35,000	40,000
Proportion of total income from jointly used property	7/15	8/15
Allocation of joint expense	7,000 (7/15 of $15,000)	8,000 (8/15 of $15,000)
Profit	28,000	32,000
Allocation of fair value	466,666.67 (7/15 of $1,000,000)	533,333.33 (8/15 of $1,000,000)
Rate of profit to fair value	6%	6%

Value apportionment between the different activities depends upon whether it is proper that, say, 7/15 of the joint income requirement should be made up out of intrastate business. To resolve this question is to determine whether it is better policy to distribute the requirement in these proportions as compared with any other tentatively selected apportionment. Some other apportionment might not be practical for the reason that the demand on the part of the public might not fall in line with the preconceived burden. Another division of the burden might not be in the best interest of the public as restricting access to the facility and allowing a portion of its capacity to go to waste. The division of the total income requirement, it is submitted, ought to be made upon such a basis, rather than upon the merely arbitrary assumption that a minute's use of the facility or a like physical quantity of energy expended is equally valuable in either activity. Unless it is clearly apparent, that, say, the intrastate business is making a contribution of a wholly dispropor-

tionate nature to the total revenue requirement, it cannot be said that the rates are confiscatory. It is difficult to conceive that conditions would ever exist in which the inadequacy of intrastate revenues were so clearly apparent. The use would have to be considerable and the margin of revenue over direct expense slight.

For purposes of expounding the general principle, we have assumed that the rate of profit to be earned upon any capital value proper to the enterprise should be the same. Some qualification to this assumption may be conceded, with the note, however, that it is probably not applicable to this case. Items of property assembled together in a business are not to be regarded as having separable earning power. They are partners in common productivity, and the community in earning power, as each supports the other, is such that to any invested dollar, the same earning power is attributed. Yet the question is one of degree. We may suggest, not without diffidence however, that special circumstances having primary reference to one branch of the business might not render all others sharers therein. Such differences of risk or advantage for or against a particular commodity or class of customers may be accounted for by and through different rates of profit. Of course such different rates, each the product of refined analysis, will equate to a single one, and this will ordinarily be most satisfactory for practical use.

12. Divided Powers to Regulate Rates Are Complementary; Confiscation Is Result of Insufficient Contribution to Total Requirement.

The allocation of governmental control over rates between state and nation cannot therefore be determined

upon the basis of a mathematical formula, which without regard to the entire business and the relative values created by the several activities, cleaves the value in two. It is a pretty intellectual concept that the federal and state power should each be supreme in its domain, but it is futile to assume that property in its nature indivisible and uses related and contributory can divide in subservience to this concept. We have seen that, in respect to railroads, the power of the state to control intrastate rates has scope only if the rates are in harmonious relation with those in interstate commerce, and make an adequate contribution to the total revenues as prescribed by the national regulations. In effect, therefore, the state authority determines in the first instance the contribution which the intrastate output of service should make to total revenues, subject to the paramount power of revision by the Interstate Commerce Commission. In the communications business, a similar national power of revision has not yet been created by legislation. Restraints upon the exercise of state power must be found in the Constitution and administered by the courts.

Upon what basis can it be said that intrastate rates as a whole are confiscatory. Repudiating utterly the idea that apart from the relationship of proper rates themselves, a strictly intrastate fair value of jointly used property can be propounded, the writer submits that intrastate rates which yield a substantial sum above direct expense, sufficient to avoid condemnation as arbitrary, can be decreed to be confiscatory only on the basis of two subsidiary propositions. The first is that the income from the commonly used property as a whole is constitutionally inadequate; the second, that the confiscation be caused by the disproportionate contribution of intrastate revenues.

As has been indicated, the foregoing points could not well arise before the courts in a railroad rate case on account of the adequacy of the administrative remedy before the Interstate Commerce Commission. In telephone rate cases, owing to the hiatus in governmental control, they are invariably presented. In this latter class of case due to the special facts of the business, confiscation, if it exists, can with reason be attributed to the insufficiency of intrastate rates. It could scarcely be cured by increasing the rate on long distance communication. Indeed, such an increase would in all probability diminish rather than increase revenues. Accordingly, it is not unreasonable to assume that the revenues provided by the interstate long distance rates represent a proper contribution to total revenue requirements from this class of business. With these revenues as a fixed standard, a unit of service, as for example, a minute's use of the identical property, will have a different value in each use.[1]

Apportionment on the basis contended for here, will give recognition to this inevitable difference in the relative values of the different uses. Its practical application to actual cases will be very simple. Since the ultimate result of such apportionment is to equalize the rate of profit made in each activity—a logical sequence of joint production—the adequacy of existing rates may be tested without apportionment simply by ascertaining whether the total revenues are compensatory. By taking the enterprise as a whole and calculating the rate of profit upon

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[1] The Public Service Commission of Wisconsin, in the opinion supporting an order for a state-wide investigation of telephone rates, Re Wisconsin Telephone Company, P.U.R. 1931 C 101, 108, suggested consideration of the relative value of the two services as a factor in rate-making. The Commission, however, did not follow up this suggestion in its opinion and order fixing temporary rates, dated June 30, 1932, Re Wisconsin Telephone Company, P.U.R. 1932 D, 173, 229-231.

its capital value earned therein, the result will indicate the rate of profit earned in any of the joint activities, provided that a substantial return over direct expense is earned in each activity. Referring to the example appearing upon page 41, it may be ascertained without apportionment that the rate of profit in the intrastate business is 6 per cent. The total revenues in both activities are $100,000 and the total expense direct and joint are $40,000 leaving a resultant profit of $60,000 or 6 per cent of the fair value of $1,000,000. If the return thus ascertained is found to be compensatory, the case based upon constitutional grounds is at an end. If, however, the total return is found to be confiscatory, it must clearly appear that the interstate rates are not responsible for that condition. If the revenues therefrom can be taken as the measure of the return from this activity, the deficiency must of necessity be made up by the intrastate rates.

It is not necessary to cast the divisions of governmental authority into rigid molds, each excluded from the other as by a Chinese wall. We think it better to regard the power to regulate a single business as an entirety, which has been subjected to distribution. Each phase thereof must have a proper correlation with the whole; and the result of the exercise of one power must harmonize with that of the other. Until the duty of creating this necessary harmony is lodged somewhere, the power necessarily remains distributed. What has been done for railroads in coordinating regulation by enlarging the control of the Interstate Commerce Commission over intrastate rates, has not yet been accomplished for telephone companies. Accordingly, any prescription by state authorities of compensatory requirements for intrastate traffic, impliedly involves a determination of what this traffic should contribute to a total requirement itself considered reasonable.

13. Criticism of Division According to Time of Use.

We shall briefly consider and dispose of the company's method of dividing the value of jointly used property between interstate and intrastate uses.

A division made according to time of use must rest logically upon the thought that for purposes of dividing fair value, a minute's use represents or corresponds with an equal value quantity. Stated in another way, the idea is that when constitutional requirements are in question, a minute's use is equally valuable. Any earning power attributed to a minute's use beyond this constitutional standard obtained by dividing the fair value by the figure representative of the total minutes' use is presumably due to the fact that the particular rate making authority has the power to enlarge returns to something in excess of what is merely constitutionally adequate. Upon dividing the value of the jointly used property in proportion to the division of total use between the two activities, we have, according to the claim of the company, a division corresponding to the division of regulatory power between state and nation.

There is no commercial warrant for the idea that a minute's use is equally valuable; and if it is not equally valuable, how can it be used as a divisor of *total cost or total value?* The revenue resulting from the minute's use of so-called exchange facilities for long distance purposes, after deducting the direct expense applicable to the toll lines, including a reasonable profit allowance for their use, is disproportionately large in comparison with the revenue resulting from a minute's use of the same exchange plant for an exchange message.

In exchange service the minute's use is in no sense a basis for determining the price of service to the customer or the cost of service to the company. If it were made such, the effects would be most remarkable. Lengthy conversation, which at present costs no more than brief, will be drastically curtailed, but not however without having the strange result of completely destroying the laboriously compiled allocations made by the company. As we have previously pointed out, any division of a value quantity by or into units presupposes equivalence in each unit. Equivalence of what? Obviously of worth. Equivalence of worth must of necessity manifest itself through imposing an equal burden upon the selling price of that into which the service is incorporated. The selling price of exchange telephone service has only a fortuitous relationship to time of use. A dollar each paid by different customers upon a flat rate basis, or even upon a message basis, will result in a widely different duration of use per customer. One might exhaust his dollar's worth of use in, say, a half hour. Another might indulge in many hours of conversation per day. The company claims that the time of exchange use, added together, should be compared with the brief, costly and valuable time of interstate use. This subject could be pursued into further ramifications, among which might be mentioned the distribution of use in interstate facilities between customers and between localities. To what extent are exchange customers to be regarded as sharers in each other's use of facilities for long distance communication? We believe that we have exhibited the fundamental elements of community of interest as between customers and parts of the business, so that further refinements of detail may be excused. The principle for which we contend is simple, and when fully realized the logic upon which it rests completely rebuts all inconsistent contentions.

That principle of value distribution, or accountancy in accordance with the value of services, correlative with the distributive parts is fundamental and inherent in all distributions of value quantities. Its application and validity will, we trust, be made even more apparent in our discussion of valuation and depreciation which is to follow.

14. Practical Application of Joint Cost Principle to This Case

The practical application of the principle of cost and value apportionment between different uses or activities which we expound is simple. The procedure of allocating out the direct expenses would be an onerous task, but as has been explained, this mode of approach may be circumvented by a short route which arrives at the same objective. This short route is progressed through the medium of equalizing the rate of profit. It is only necessary first to define the total and undivided receipts from the interstate business. Proper portions of this total must be allocated back to the local companies with due regard to the just distribution between them. This will proceed until the rate of profit shown for the Long Lines is at the standard for the purpose—that is, at the lowest point to avoid the charge of confiscation. The revenue apportionment thus resulting to the particular local company, added to the intrastate revenues which it receives, will represent the compensation for the use of all of its facilities. It may then be determined whether or not such revenues are confiscatory, conceding of course that confiscation, if it exists, is a result of a deficiency in intrastate revenues. This method is equivalent to allocating out a portion of the total value of jointly used property. It is, of course, taken for granted that no service is ren-

dered at less than direct cost, an assumption quite proper in view of the evidence.

Western Electric Company, Incorporated, and its subsidiaries may, for the purposes of a tentative calculation, be regarded as a unit and the rate of profit on the stockholders' interest may be determined. This record, however, scarcely permits of such a determination because it lacks evidence of ending or liquidating capital values necessary to a proper calculation. After this profit has been discovered a standard of reasonable profit to such interest must be determined and a redistribution upon equitable terms of the selling price represented by Bell sales must be made so as to reduce the profit rate to a reasonable one. The very theory of joint production makes it possible to redistribute the relief of excess profits realized in Western Electric Company, Incorporated, in the form of a uniform percentage deduction from the purchases. We fully realize that under the method of accountancy used by the company different profit rates appear to be made on different items, and that no such thing as a representative cross-section of purchases could possibly have been made by any one company. We cannot, in this record, produce a reliable estimate of the difference which a redistribution of Western Electric Company's profits will make to the fair value of the property in any one company. The writer believes that the element, though substantial, is not that of greatest magnitude in the case. However, it must be measured upon the basis of an adequate presentation on the part of the company, and this the latter has signally failed to accomplish.

Profits realized in the American Telephone and Telegraph Company would likewise need to be determined, and the excess redistributed to the local companies. Such profits would include gains, if any, liquidated through in-

terest payments by Western Electric to the American Company. We shall spend no space in criticizing the showing of cost of the license contract services made by Mr. Heiss, the comptroller of the American Company. We have already indicated its general deficiencies. One comment may be made. The claim as to cost of money is founded upon an erroneous definition of cost. In seeking to ascertain the cost of money, so-called dividend requirements for stockholders is included as a cost. It cannot rationally be said that the use of stockholders' capital is an item of purchase and has a cost; and to assume that the reward of profit is a cost is to beg the question. It was therefore incumbent upon the company to show the outlay on the part of stockholders, and the gains which have resulted to them in undertaking the license contract services, including financing. It would be apparent that the so-called services are merely ministrations to the investment, fostering a dividend rate of $9 per share, accumulating huge surpluses, and appreciating the value of the stock held in subsidiaries. The services and the investment are inseparable; and we therefore contend that cost determination is governed by the joint cost principles here propounded.

IV.

GENERAL DEFINITION OF VALUE

1. Meaning of Value

Value is the result of a relationship between the human subject and an object. The subject has a desire for, or an interest in the object and therefore invests it with value. The power which things possess to satisfy human

interests gives them character as being worth something. We may call the satisfaction or good which objects render to mankind their services. The ultimate services are enjoyed and render up their good in terms of satisfaction. But in advance of such enjoyment the source of such residual services is also valued as provision for the future. As a stock of services, it has a value derivative from the services themselves.

The degree of value is measured by the intensity of desire and is hence relative. Despite variations in desires between individuals and even in the same individual, the possibility of value measurement exists. The desires of many people in relation to many different objects tend to establish general standards of comparison. Objects may be exchanged, thus measuring off the strength of the desire for one as against that for the other.

'By economic value is meant the value of a commodity in exchange.[1] The primary reference here is to the measurement of value, and the standard thereof is one of market experience. The value of each commodity is constantly being measured in terms of some other commodity for which it may exchange at certain quantity ratios.

The economic value of a thing is measured by its power of commanding other commodities in exchange. Every exchange is a mutual sacrifice and a mutual gain to the individuals who are parties to it. It testifies to the fact that the desire for the acquest is greater than that for the sacrifice. The unconcerned onlooker, however, is impressed by the element of exchange in the transaction, and seeing that each commodity possessed the mutual power of commanding the other in exchange, he concludes

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[1] Taussig, Principles of Economics, 3rd Ed. 112.

that they are of equal value. This conclusion is often given a far too enlarged construction. We are prone to measure the value of all goods, including those held under conditions of special advantage to the owners, at what goods of similar description may exchange for on the market. The matter is not so simple. Market price is only an index to the value of the total stock of such goods and its intelligent use in appraisals depends upon judgment relative to quantities bought and sold, and the private advantages which may be enjoyed by those who retain possession of like goods.

The measurement of economic value by the processes of exchange, and the consequent equating of sacrifice and benefit, causes comparison to be made between goods of widely different character. Obviously, they must possess a common element which makes comparison possible. This element is found—to advance a step beyond psychic satisfaction—in their command over money income. A most interesting value comparison comes about when the commodity exchange is a right to future income. This right is purchased and paid for in terms of present money. It is found however, that, rare and special cases excepted, a given quantity of present money will command in exchange a larger quantity of future money. Nevertheless the fact that these different quantities are exchanged one for the other proves that at the time of the exchange each was equivalent in value. Consideration of a loan may serve to illustrate that equivalence. If $100 is loaned for one year at 6 per cent interest, the lender has purchased the expectation of $106 realizable a year from the present. But the acquest and the sacrifice are equivalent, and that is to say, $106 of money to be paid a year hence is today worth $100. This example is typical of the fact that the time dimension is an essential consider-

ation in the valuation of all commodities except those for immediate consumption.

2. Dependence of Capital Value Upon Income

The time aspect is really inherent in the meaning of capital. One's capital is his provision for the future; and capitalistic production is that which requires a provision of instruments in advance. Capital goods thus embody a stock of future services which are drawn off like oil from a well, wool from sheep, or apples from trees. The result of any productive process is income—that which is withdrawn therefrom. Capital and income designate aspects of the productive process from different points of view. "Capital is a stock of wealth existing at an instant time; and income is a flow of services through a period of time."[1]

Income as here used must be distinguished from earnings. It means the total money realization as a matter of fact and event. If one makes a loan of $100 and at the end of the year he receives payment thereof plus interest, say $106, we would call the entire amount, and not merely the profit, the income. The realization of income is a matter of fact, not of estimate. Whether or not the value of the capital is impaired or has depreciated or is completely exhausted, is of no importance in determining what the income is in fact. The actual income is the money realized, less only the attendant cash disbursements which are paid, or rationally regarded as paid, out of receipts, no new outlay being required.

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[1]Per Irving Fisher, whose books, "The Nature of Capital and Income," and "The Theory of Interest," represent full and definitive treatments of their subjects.

Income is distinct from capital because it is the service itself, whereas the capital goods are the source of the income. Their value is capital value. That value, however, is based upon and measured by the income expectation which is in prospect from the conversion of the stock of services into money.[1]

Capital gain is to be distinguished from income. For example, if the debtor at the end of the year does not pay his note amounting to $106, but instead makes out a new note in which the principal sum is $106, there has been no income realized by the creditor. A profit in the form of a capital gain has been earned.

The analysis of capital value into its component elements is neeessarily accomplished first by a delineation of the income expectation, and then by an appraisal of its several items in terms of present money. For the purpose of defining these elements let us consider a simple case of bond valuation.

One who invests money in a bond merely purchases, at some degree of risk of course, a defined future income. It takes the form of periodical interest payments and a final payment of the face of the bond at maturity. The risk involved extends to non-payment of the income and to changes in its value between the present and the time of realization. When the amount and distribution of income is postulated as a definite fact, the element of risk will be completely expressed in the valuation factor, that is, the amount at which a unit of income—one dollar—is valued. Table I illustrates the value of a nominal 5 per

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12 Taussig "Principles of Economics," 3rd Ed. 125; Fetter, "Economic Principles" 267.

cent bond for $100, payable in 10 years under different assumptions of risk, one in which the valuation is at 5 per cent and the other at 4 per cent. The third and fourth columns show respectively the discount factors, that is to say, the present worth per dollar of future income when it is valued, as in column 3, at 5 per cent, or as in column 4, at 4 per cent. Columns 5 and 6 show the present worths of the incomes at the several valuations.

TABLE I.

Comparative Value of a Nominal 5% Bond, Payable in Ten Years. Market Rate of Interest 5% and 4%

1. Year	2. Income	3. Discount Factor 5%	4. Discount Factor 4%	5. Present Worth 5%	6. Present Worth 4%
1	$ 5	.952	.962	$ 4.76	$ 4.81
2	5	.907	.925	4.53	4.63
3	5	.864	.889	4.32	4.44
4	5	.823	.855	4.12	4.28
5	5	.784	.822	3.92	.411
6	5	.746	.790	3.73	3.95
7	5	.711	.760	3.55	3.80
8	5	.677	.731	3.38	3.66
9	5	.645	.703	3.22	3.51
10	105	.614	.676	64.47	70.98
		Market Value of Bond		$100.00	$108.17

The significance of interest rates, or rather their counterpart, discount rates, as valuation factors must be emphasized. It is a frequent assumption that interest arises purely out of the productivity of wealth. Now of course production is usually accelerated by provision in the way of tools and equipment previously lacking. Such provision requires financial investment which is rewarded

by the gain in productive facility. The skillful application of wealth to productive processes is a means of producing increase of wealth. The control of present goods is thus frequently the means of commanding advantageous opportunities to increase wealth. This element, of course, enters into the market premium which will be offered for capital. But, important at it is, it is not the only factor in that premium. Generally speaking, present wants or necessities are more keenly felt than those which are merely anticipated. Likewise there is a clear preference, generally speaking, for present gratification in comparison with future. This natural psychological condition interacts with the technical conditions of value productivity and causes an under-valuation of a merely future good as it is compared with the same thing at present available. This value comparison is expressed in a rate of interest, or discount. The former is applied to a capital value base and represents a premium thereon per unit of time; the latter, discount, is applied to the future value quantity and represents the present worth per unit thereof.

The valuation of defined money incomes by the process of discounting the income expectation is simple and commands universal assent. Nevertheless, the capital value of other goods is, from an analytical point of view, composed of the same elements. The definition of the income prospect, and the rate at which it is discounted, are not without interdependence. Prospective income may be defined with varying degrees of certainty. It may be forecast in terms of the maximum probable, the minimum probable, or at any other degree of assurance. The discount factor will then be burdened with any remaining elements of risk.

In describing the nature and basis of value and its dependence upon income, we are not advocating a specific method of appraisal. We are rather describing the analytical breadown of the capital value quantity upon the assumption that the means of determining it produced a valid result. There are, of course, shortcut indexes of value which, while they do not seem to represent the capitalization of expected income, nevertheless in a circuitous way amount to the same thing.

The basing of value upon cost is such a method. The willingness to incur the cost is ultimately derived from the prospective income value of that which is purchased or produced. The incurring of cost carries with it no assurance of correlative appreciation, else in the oil fields dry holes would be worth as much as gushers. However it is sufficient here to note that regardless of whether cost in the particular case is reliable evidence of value, that value is what it is, not because cost was incurred to create it, but rather because an income prospect exists to support it. The analytical breakdown of capital value which we describe here is not advanced for the purpose of composing initially the values involved in a rate case, though these principles applied in appraisement are of obvious significance. Initial values change in the course of time and without an analysis of component elements the degree of change cannot satisfactorily be measured. For example, cost may serve to measure the value of goods when they are acquired; and it is indeed the piecemeal purchase price of any existing plant. But that cost, upon any theory, can only serve as a measure of value at a subsequent time only if it be assumed that all exhaustion in value has been replenished. Such an assumption cannot be taken for granted. It should be emphasized that any valuation has a focal time point of view, depend-

ing upon the nature or time shape of the prospective income stream and the rate at which it is discounted. The ensuing value quantity is subject to appreciation or depreciation depending upon the manner in which prospective income is apparently distributed. It is impossible to value property at a figure having a durable validity.

V.

THE LEGAL CONCEPT OF FAIR VALUE

Fair Value is a legal concept. It is designed to express the worth of the business in view of the fact that the full force of legal restraint upon its income has been exerted. The nature of Fair Value is easily perceived from the manner in which the occasion to determine it arises. An exercise of legislative power has occurred, by force of which the power of the owner to obtain revenues otherwise open to him is restricted. If not for the legislative act the utility would be free to sell its services at prices which would yield the most favorable possible income from its point of view. The power to obtain such a charge the existence of a consumer's surplus must be granted, else to assume to ask it is merely an empty gesture. In the absence of such restrictive legislation the value of the business is one amount; in view of the maximum possible restriction, the value of the business is another amount.

It is quite clear that the Constitution protects only a modicum of value. If the protection extended to all value, then the power to regulate is empty. If the power to regulate is without limitation, then there might be no value in owning the property. This was cogently pointed out by Justice Holmes in the opinion of the Court in

Cedar Rapids Gas Light Co. v Cedar Rapids, 223 U. S. 655:

> "An adjustment of this sort under a power to regulate rates has to steer between Scylla and Charybdis. On the one side if the franchise is taken to mean that the most profitable return that could be got, free from competition, is protected by the 14th Amendment, then the power to regulate is null. On the other hand, if the power to regulate withdraws the protection of the Amendment altogether, then the property is nought. This is not a matter of economic theory, but of fair interpretation of a bargain. Neither extreme can have been meant. A midway between them must be hit."

Through the course of judicial decisions it has come about that the Constitution is interpreted as according immunity to a certain and limited amount of property value. Another and extremely cogent interpretation of the Constitutional purposes, which would emphasize the element of conduct more than that of value measurement, might consist in an assertion of immunity against conduct clearly unreasonable. This doctrine, while not without vitality, has given way to the thought that it is the function of the court not merely to test conduct according to general standards of reasonableness but to measure a certain value quantity to which immunity must be accorded.

The early cases of *Covington and Lexington Turnpike Road Company v. Sanford*, 164 U. S. 578 and *Smyth v. Ames*, 169 U. S. 466, while interpreted as defining fair value in purely economic terms, emphasized nevertheless a significant aspect of the fair value concept. "The utmost that any corporation, operating a public highway, can rightfully demand at the hands of the Legislature

when asserting its general powers is that it receive what, under the circumstance, is such compensation for the use of its property as will be just both to it and to the public."

The dominating idea therein emphasized is that of compensation. Now what shall be deemed compensatory is not a purely objective matter. One is compensated when satisfied, and reasonable compensation is simply what in general opinion ought to be satisfactory. A sacrifice has been incurred for which a measure of compensation up to a certain level should be provided. This level is not necessarily attained by an arithmetical addition of all costs. For example, if one were put to a cost of $100 ten years ago, $100 today might not constitute complete compensation. There has been involved in the sacrifice the foregoing of all the opportunities which the power to invest over ten years could command. The presence or absence of past income would be a material factor in determining proper compensation. Again the monetary unit of measurement may have undergone substantial changes since the costs were incurred.

These cases likewise strongly emphasize the element of value of service to the customer and his right to a reasonable access to the facility. This question is not of grave importance in measuring the constitutional requirement of just compensation in this particular case. However it has strong application to the element of price distinction in various classes of service to which reference has previously been made.

In the search for formulas out of which a rate base could be constructed, there has been overlooked to a large extent the true purposes of the endeavor and the function which a rate base should perform. This oversight consists in the failure to coordinate the idea of com-

pensation with capital value. After all, sacrifices have been made in creating the facility of service to the public. The fair value, as that concept is qualified by considerations of justice, is only an amount measured in terms of capital value as will contain the required compensation. It will not be the capital value of the enterprise on the assumption that regulation did not exist. In view of the monopolistic character of the regulated business, and the special advantages which it enjoys in rendering a service constantly in demand, a capital value merely compensatory in amount will be much less than what would be the commercial value of the property if regulation were non existent.

This fair value, determined under the influence of a due regard for compensation is, nevertheless, like any other capital value, the capitalization of all expected income. If it were not such, it would be a merely arbitrary figure, a rate base derived from a formula and applied in darkness. Fair value is therefore Janus faced. On the one hand it regards the sacrifices of the past and is an amount, from a present point of view, equivalent in worth thereto. On the other hand this fair value is likewise the present worth of the future income, which should be secured under proper rates.

The derivation of a rate base has been regarded as the major problem in the regulation of rates. Jurists and writers have very largely concentrated all attention upon whether the rate base should be primarily influenced by the cost of the property, or what it should have cost, or its present reproduction cost. Decisions upon such abstract questions have apparently determined whether rates are to be increased or decreased. We characterize these questions as abstract because they do not actually emanate from, and find their application and meaning in, the facts

of the particular business; whereas, in our judgment, they should, in order to have concrete meaning. For example, of what avail is a rate base if it is not going to be applied with reference to the technological facts of the business and the inevitable concomitant economic facts? Any rate base is totally without significance unless the time-shape of the prospective income stream which it should summarize is recognized. In short, concentration upon the derivation of the rate base has resulted in submerging a subject of even greater importance; namely, the proper technique of determinating the price of service by reason of which the property is worth the sum expressed in the rate base.

At this point we are concerned only with a qualitative definition of fair value, rather than of its precise quantitative determination. However, *Smith v. Illinois Bell Telephone Co.*, 282 U. S. 133, by necessary implication has placed strong emphasis upon a preliminary measurement of actual profits, and this requirement places the cost standard distinctly in the foreground. If the principles herein advocated should be given application, it will be seen that the factor of rate base difference, while one of substance, is not of necessity controlling. In many cases there are other considerations which, taken in connection with the particular claim for fair value, demonstrate that the rates attacked are not confiscatory.

VI.

FUNDAMENTAL RELATIONS OF INCOME AND FAIR VALUE UNDER SIMPLE HYPOTHESES

It has frequently been taken for granted that, given a rate base, by means of simple and obvious methods, fair

rates could be computed. Could not the annual expenses of production be ascertained and could not the company be allowed rates which would provide the amount thereof plus a reasonable profit on the rate base? Now the fallacy in this attitude, stated in a word, consists in the fact that an arbitrary and *a priori* definition of the annual expense of production is applied. This is derived largely from the bookkeeping results of a single year's business, modified, perhaps, by a host of arbitrary accountancy concepts.

We shall not stop at this point to expound the grounds of this fallacy in abstract terms. We propose to proceed concretely, with specific examples in view, so that each relevant fact involved in the income and capital value relationship will be made to appear. From such results, general conclusions may be drawn.

Beginning with a minimum in the way of assumption, we shall gradually work into the exposition further conditions typical of those actually present in the conduct of business.

We shall first define a few terms.

Revenues are the receipts from customers for service.

Disbursements are all expenditures of money to obtain revenues.

Income is the amounts realized in the process and withdrawn therefrom for the benefit of the owner.

Outlay is that part of the disbursements which are direct expenditures by the owner and are not provided for by the revenues of the current accounting period.

Suppose that a market analysis indicates that annual sales of service at least to the amount of $200 per year may be made, and that after due eliminations there is

available plant of a certain design which will supply this demand for a period of ten years. Its initial cost is $1000, and at the end of its assumed production period there will be no salvage value remaining. In order to obtain the service an annual expenditure of $64.13 is required. The figures here stated concerning future revenues and disbursements represent a fair approximation of what is expected. If they were certainly foreknown, then the appropriate valuation factor to relate them to the present would be the riskless rate of discount. The 6% rate is chosen upon the assumption that the risk contained in the approximations are assumed to be comparable with that in other investments yielding 6% returns. Table II indicates the elements involved in the appropriate equation of value under the conditions here stated.

TABLE II.

Income and Capital Value Derivation

1. Year	2. Revenues	3. Disbursements	4. Income	5. 6% Valuation Factor	6. Present Worth of Income
0		$1000			
1	$200	64.13	$135.87	.943396	$ 128.1
2	200	64.13	135.87	.889996	120.9
3	200	64.13	135.87	.839619	114.0
4	200	64.13	135.87	.792094	107.6
5	200	64.13	135.87	.747258	101.5
6	200	64.13	135.87	.704961	95.7
7	200	64.13	135.87	.665057	90.3
8	200	64.13	135.87	.627412	85.2
9	200	64.13	135.87	.591898	80.4
10	200	64.13	135.87	.558395	75.8
					$1000.0

The table illustrates that annual revenues of $200 are required in view of the assumed facts. That sum is the minimum price which the owner can afford to charge. On account of the annual disbursements of $64.13 contemplated, the income expectation is approximated, in view of probable deviations in both directions, at $135.87 annually. Now if the scope of the purview is limited to the current year, and the owner sees only in prospect a single year's income of $135.87, and nothing beyond, he is not going to incur a present outlay of $1000 for it. In fact if the income prospect is limited to a year, then the owner cannot afford to spend $1000 unless the income expectation is $1060 at the end of the year. And if he can regard a ten year prospect but is forewarned that in the last year he will only get revenues of $100, he cannot afford to sell the output of the first nine years at $200 annually. He must revise the rate. It is obvious that when there is in question the minimum price which must be charged for service, the total income prospect must be regarded. The minimum price at which one can afford to sell any one unit of output is dependent upon the quantity of total output and the price or prices contemplated for all units.

This example assumes an equal amount output, which has always the same relative value to the customer, since he pays the same price at all times for like service. It also assumes equal annual disbursements, excluding the initial outlay. These expenditures are recouped practically as made, and their complete effect is fully accounted for simply by deducting them from simultaneous revenues. Then the question of determining a minimum rate is this: What equal annual income for ten years is worth $1000 of present money? The answer is $135.87. Each income item, discounted by the 6% factor shown in

Column 5, makes a value contribution to the capital worth as shown in Column 6, which totals $1000.

It will be convenient to elucidate, in connection with this and further examples, the effect of the movement of time upon capital value. This introduces the element of change—depreciation, and appreciation—in capital value due to the simplest possible dynamic condition, the passing of time.

VII.

VALUATION DEPRECIATION

1. Definition of Terms in Revaluation

When a *revaluation* is made, and a comparison is had between value at such time and value formerly, the result usually indicates *depreciation.* Sometimes *appreciation* is found. We define depreciation simply as a lessening of *value;* appreciation as an increase of value. These terms, thus broadly defined, include all changes in relative value during the course of time, regardless of the causes which bring them about.

2. The Nature of Depreciation

The essential nature of depreciation—a lessening of value,—is not to be confused with the causes which bring it about or the facts which evidence it. Deterioration may indeed indicate that depreciation has taken place; depletion signifies diminution in the stock; but the resultant effect upon value brought about by the physical fact of deterioration or depletion consists in the lowered estimate in which the goods are held. Whatever causes a

relative decline in esteem is a cause of depreciation; the amount of which is measured, not in terms of physical quantities, but in terms of value.

It will therefore be seen that depreciation is not the kind of a fact that is capable of measurement by rule or caliper. It is a term of value comparison; the value of a stock of services at one time point of reference is compared with its value at another time point. It follows that every fact which has any material effect upon value is likewise relevant to the study of the downward movement of values, or depreciation.

It is often highly useful, however, to distinguish between certain causes of depreciation which characterize the nature of the decline in value. The effect of price changes upon value may be considered as a case apart from that value decline which usually attends property by reason of its use in operations. The former case has a primary reference to the value of money; the latter case consists in depletion in the stock of services. And we also defer consideration of another important dynamic element—changes brought about by the ability to substitute a more efficient or economical technical means of production. The inward and outward movement of plant items under the influence of this consideration is of great import. It profoundly qualifies the assumption of a definite service life which we have made in this chapter. We have deemed it necessary to make that assumption, first, because the facts and principles may be more easily apprehended when expounded under hypothetical simple conditions; and secondly, because, since this assumption is not infrequently given general application, it is desirable to show its limitations in view of a continuous business. The assumptions at this time will, therefore, include only the minimum of dynamic conditions. Cost and reproduc-

tion cost new will be, in assumption, constant, and the ability to substitute different instruments or methods of production will be excluded. These assumptions in reality have the effect of excluding all causes of depreciation such as price change, obsolescence, and inadequacy, which do not result in depleting the stock of physical services. We open up shop with a plant having a certain foreseeable output which will be distributed over a certain "service life." Under such conditions, depreciation results from the fact that the stock of services runs out in time.

3. Property Subject to Depreciation

No property is essentially undepreciable. Obviously, any property may have a value at present less than that ascribed to it at a prior time. Even if an assumption of constant prices be made, there is no property which must of necessity endure perpetually as an undepleted stock of services. The services of land are depleted by agriculture, lumbering, mining, quarrying, and, what is important here, by the loss of its advantages of location. Land renders services of varying quality and magnitude, its capacities being always affected by its proximity to people, and its economic adaptability to render services which are in demand. The depreciation of land is a capital loss, its appreciation a capital gain. Like other capital goods, land renders a constant service in the production of income, and when its usefulness in plant is over, it renders up a final income as salvage.

4. Valuation and Depreciation

At the commencement of business, as the plant is about to initiate the stream of services on account of which it

is valued, we tend to think that it has then its maximum value—value new—and that it will gradually depreciate as the stock of services therein contained becomes depleted in the course of time. Such a situation is typical and will be the basis of the initial examples.

We have seen from Table II that property capable of rendering an income of $135.87 annually for ten years, when interest is at 6%, has an initial value of $1000. In this case the capital goods represent a stock of services to the owner, or incomes the realization of which, it is expected, will be distributed equally over a period of ten years. We have had occasion to note the reference of time to the subject of valuation, and to observe that the capital goods which are the source of future income are ordinarily worth less than the amount of such income. Here we have ten items of income, for the sake of which the capital goods are valued at $1000. These items are of equal value only when each is realized; and since each is realized in different years, each makes a different contribution to the initial capital value. The contribution of each item to such initial capital value is indicated in the last column of Table II. The expectation of the first item, to be realized a year hence, has a weight in the capital value of $128.18; the expectation of the last item, to be realized ten years hence, has only a weight in the present value of $75.85. If, however, the time point of view is shifted to the realization of each item, at each of said times the income then realized is then worth its amount, or $135.87. However, the valuation of capital goods depends upon the simultaneous worth of the incomes in prospect. This, at year 0 is $1000.

When, however, a year passes, the valuation time point of view is shifted. The present has advanced a year and

each residual item of income is a year closer to realization. The worth of each will have appreciated. The first item has already been realized and is hence removed from consideration. The other items are to be discounted by the factors pertaining to years one to nine. So discounted the weight of each in the then capital value is: (1) $128.18; (2) $120.93; (3) $114.08; (4) $107.62; (5) $101.53; (6) $95.79; (7) $90.36; (8) $85.35; (9) $80.42. Their sum—$924.13—represents the capital value at the end of the first year.

The depreciation is the difference between the initial value (V_o) and the value at the end of the first year (V_1), or $75.81.

The capital value, the annual depreciation, the annual profit, and the total accrued depreciation throughout the service life, are set forth in Table III. These elements are all mutually interdependent. All of them depend upon the nature of the income prospect and its running out in time, and a change therein will have a general effect upon each element.

TABLE III.

VALUATION DEPRECIATION TABLE

V=Capital Value; V_a=Capital Value any Designated Year

Year	Income	Capital Value	Annual Depreciation	Annual Profit	Accrued Depreciation
0		$1000.00	$(V_{a-r}-V_a)$		(V_o-V_a)
1	$135.87	924.13	$ 75.87	$ 60.00	$ 75.87
2	135.87	843.71	80.42	55.45	156.29
3	135.87	758.47	85.25	50.62	241.53
4	135.87	668.11	90.36	45.51	331.89
5	135.87	572.33	95.78	40.09	427.67
6	135.87	470.80	101.53	34.34	529.20
7	135.87	363.18	107.62	28.25	636.82
8	135.87	249.10	114.08	21.79	761.90
9	135.87	128.18	120.92	14.95	871.82
10	135.87	000.00	128.18	6.69	1000.00

The hypothetical example of an equal annual income prospect is the simplest to set up, but it is rarely, if ever, encountered in an actual enterprise. It is, however, frequently serviceable as a rough approximation. Actually, however, annual disbursements are subject to considerable variation, and so are the annual revenues. As a result, a condition of a varying annual income prospect is the rule. It is unsound to ignore it.

5. Income Varying by Reason of Rehabilitation Expense Requirement

We take as a second example the case in which the rendition of the service cannot proceed unless money is spent to rehabilitate the property item. As in the prior example, it will be assumed that the service output is an equal annual quantity throughout the service life of the property, but that money must be spent in each year to keep up the output, and certain special expenditures need to be made in addition. We shall assume that the service actually rendered produces an annual revenue of $200, and that during each of the first five years disbursements of $60 annually are required; in the sixth year this requirement increases to $70; in the seventh year $125 must be spent, evidently to rehabilitate the property; in each of the eighth and ninth years $60 must be spent, and in the tenth year $70 are spent. At the end of the tenth year the property is junked, producing a salvage realization of $45.56, which are of course part of the revenues. Subsequent to the initial capital outlay all of the required disbursements may be made out of revenues. For this reason, if the annual disbursements be deducted from the annual revenues, the remainder will constitute the income, or what the owner receives

from the use of his property. This income may be accounted for as annual depreciation representing the return of capital value as the same is consumed, and profit representing the gain allocated to the accounting period.

TABLE IV.

VALUATION DEPRECIATION—VARYING ANNUAL INCOME CAUSED BY REHABILITATION EXPENSE

Year	1. Revenues (*Salvage)	2. Disbursem'ts	3. Income	4. Capital Value	5. Annual Depreciation	6. Annual Profit	7. Accrued Depreciation
0		$1000.		$1000			
1	$200	60	$140	920.00	$80.00	$60.00	$ 80.00
2	200	60	140	835.20	84.80	55.20	164.80
3	200	60	140	745.31	89.89	50.11	254.69
4	200	60	140	650.03	95.28	44.72	349.97
5	200	60	140	549.03	101.00	39.00	450.97
6	200	70	130	451.97	97.06	32.94	548.03
7	200	125	75	404.09	47.88	27.12	595.91
8	200	60	140	288.33	115.76	24.24	711.67
9	200	60	140	165.63	122.70	17.30	834.37
10	200 *45.56	70	175.56	0.00	165.63	9.93	1000.00

The conditions of this example in a word are those of equal annual output of constant value, but with varying annual disbursements, as a result of which the income expectation has an irregular time shape. Since in rate regulation the revenues themselves are in question, let us assume that this element (column 1) is unknown. The question then becomes this: What is the least that can be charged per unit of service to compensate an owner who makes an initial capital outlay of $1,000 and contemplates expending annually the amount shown in column 2, and expects an ultimate salvage realization of $45.56?

We shall detail precisely the method of price determination in view of these assumptions.

Since by assumption the revenues from service of each year are the same and are unknown, the annual price requirement may be represented by "*X*". Those of the last year will be augmented by the salvage realization, and may be expressed as *X* plus $45.56. In view, however, of simultaneous disbursement requirements, the expected income is the result of deducting these disbursements from the revenues. Since by assumption this income is merely compensatory, its present worth and the initial capital value of the property will be equal. The value of "*X*" upon solving this equation is $200.

Thus, it is apparent that the effect of the varying disbursement requirement is not to be limited to the year in which it occurs. It is not to be a special burden upon the customers of that particular year. It was not caused exclusively by the demands of these customers, but rather by the endeavor to supply these, the prior, and the future customers. The customer pays for service; and since each unit of output is of equal value when delivered, it should command the same price. The burden, therefore, of all the disbursements must properly be distributed equitably into the price to be charged per unit of output. An equitable distribution, it will be observed, is not an equal one. It is an equivalent one.

6. Valuation Depreciation in View of Increasing Returns

The third case to be illustrated is that of "increasing returns." This condition is quite common, but strangely enough the legal mind has exhibited but slight appreciation of its existence. There has been a peculiar proneness to think in terms which take for granted a constant output similar to that of a single year taken as a sample. In fact, however, plant is usually built to accommodate a growing demand for service.

Much confusion is unquestionably caused by the use of the economic terms "increasing returns" and "diminishing returns." There is implied in these terms that costs per unit of service decrease in the former case and increase in the latter case. This idea is subject to considerable qualification, as we shall later show. At the present time we shall merely set forth an illustrative table indicating the effect of an increasing output upon capital value. No new principle is involved; and the main purpose of the example is to show how this variation in the basic facts is treated under the same principles of valuation which have been expounded. They likewise apply to the less frequent case of "diminishing returns."

The previous examples represented cases of equal annual service output, so that a year's service could be regarded as a convenient unit. When the output varies annually such a unit is obviously not helpful. We shall therefore make use of a service unit based upon the service capacity of the property. Let us assume that when operating at capacity the property delivers one hundred units of service annually, but that the expected demand is such that only 50% of the capacity will be called forth the capacity will take place. Therefore the use of the property will reach 100% in year 6. We shall assume equal disbursement requirements per unit of service, with the result that the elements of revenues and disbursements may be omitted from the example. The minimum compensatory income requirement is $1.6536 per service unit. This unit price of service is derived by the same methods used in connection with the previous example. Table V is the Valuation Depreciation Table for this case.

TABLE V.

VALUATION DEPRECIATION TABLE ILLUSTRATING INCREASING RETURNS AS RESIDUAL CAPACITY IS BROUGHT INTO USE

Year	1. Output Units	2. Income	3. Capital Value	4. Annual Depreciation	5. Annual Profit	6. Accrued Depreciation
0			$1000.00			
1	50	$ 82.68	977.31	$ 22.69	$59.99	$ 22.69
2	60	99.21	936.74	40.57	58.64	63.26
3	70	115.75	877.19	59.55	56.20	122.81
4	80	132.28	797.54	79.65	52.63	202.46
5	90	148.82	696.56	100.98	47.84	303.44
6	100	165.36	572.99	123.57	41.79	427.01
7	100	165.36	422.01	130.98	34.38	557.99
8	100	165.36	303.17	138.84	26.52	696.83
9	100	165.36	156.00	147.15	18.19	844.00
10	100	165.36	0.00	156.00	9.36	1000.00

The main condition of this Table, that of increasing output, is highly typical. A plant is seldom if ever established to serve merely the constant needs of a present population. It counts upon increasing demand and has the reserve capacity to supply the future needs of a growing community. A railroad is typically a pioneering business. As it makes possible the growth of communities which it serves, it accommodates more and more traffic until its capacity becomes completely taxed, and then further construction starts the cycle over again. There are as a rule obvious economies in constructing initially a plant of large capacity capable of caring for the future growth of business rather than to build only for immediate wants.

Under conditions of increasing output, as will be seen by a reference to the Table, the depreciation in the early years is relatively slight. It is of great importance clearly to understand this fact. We have had occasion previously

to point out how with reference to a limited stock of services, the passing of time appreciates the worth of those which still remain residual, since it brings them closer to realization. When increasing output is expected, the income stream is funnel shaped. The passing of time brings closer the larger volume, and in the early years, exhausts only the narrower end. The effect is, of course, that of relatively slight depreciation in the early years. There may even be a positive appreciation. The most extreme example of the latter occurs when property is bought purely for future use, it rendering no immediate income. Land is an obvious example of this. Due economic selection assumed, it appreciates as time brings it closer to the moment of use. It frequently continues to appreciate thereafter as time brings it closer to a fuller or capacity use. For such reasons, Table V is, on the whole, the most important which we have yet shown. The example set forth in the Table has an intimate connection with the subject to Going Value which will be later treated.

The three examples which we have set forth in detail: (1) that of constant output and equal annual revenues and disbursements; (2) that of constant output, varying disbursements and equal annual revenues; and (3) that of increasing annual revenues,—are sufficient to indicate that fair minimum rates cannot be deduced merely from a Fair Value figure. While the Fair Value is indeed but the capitalization of the minimum compensatory income, precisely what the latter needs to be, in order to satisfy the equation, cannot be deduced from the former. There is nothing in the nature of capital value which determines or describes the time shape of the income stream which is its basis. The income, composed of the interplay of receipts and disbursements, depends for its time shape upon technological and market facts, which must be reckoned with

The Tables indicate how erroneous it is to assume, as is frequently done in the uncritical presentation of a rate case, that the elements of revenue and of expense may be approximated as constants, or that a single year is of any value as a test period.

The Tables particularly emphasize the fact that the mutations in capital value, and hence the depreciation due to the passing of time, depend upon the time shape of the income stream. They may even make clear that the correctness of all accountancy with respect to any item of disbursement or receipt is also dependent upon the time shape of the income stream.

7. Allocation of Profit Between Accounting Periods

In our previous discussion concerning the division of joint expenses and of values, it was indicated that treatment of the time element was for the moment passed. It has now already been made. In principle there is no distinction between apportioning the initial capital value between accounting periods, and a division thereof between simultaneous activities. Indeed, the initial capital value may be regarded as devoted to the common purpose of providing income for future accounting periods under whatever conditions may be encountered.

At any point in time, the accrued depreciation, cost basis, is only a division of the entire cost between past and future use. It is as accurate—no more, no less—as the foresight of future income. Unforeseen income events, positive or negative, seem like windfall gains or unfortunate losses, yet they are the chances and risks of the business. The full story is not told until the particular venture is liquidated. Then only can the relative contribution of capital cost to each separate annual income be

accurately defined. Regarding capital cost as having been incurred for all income, we should distribute it so that a uniform rate of increase will be attributed to each dollar remaining invested. It is not argued that this over-all aspect is essential; but rather that it is a desirable point of view for the regulation of public utilities. It is a long run view as distinguished from a year to year regard.

Such a long-run view asserts that the apparently different rates of profit year by year are only the delusions of imperfect accounting. If the accounting were accurate, the rate of profit would be equal over a past period.

We have seen that under the assumption of equal annual income, which presumably is had when output is constant annually, the depreciation expense is not an equal annual amount. This proposition is incontrovertible. We have also seen from the Tables the manner in which depreciation expense varies, subject to the distribution of income. The apparent inequality of annual profit is brought about by a rigid and arbitrary system of depreciation expense charges. Whatever may be the merits of such systems for bookkeeping purposes, revision is essential when the correctness of the profit rate comes into question in rate cases. A redistribution of the annual depreciation expense so as to equalize the rate of profit is necessary.

We have already proved, from two major aspects, the fundamental correctness of the result thereby attained. The first aspect had to do with the principles to be applied in distributing a joint expense or general value. In the second, emphasis has been laid upon valuation and depreciation. The distribution of depreciation expense so that a uniform rate of profit results is not at all a matter of artificial juggling. It is in accord with the value of the

service rendered by the capital goods and with the actual devolution of the capital value. Let us refer once more to Table V for the purpose of re-emphasizing the point.

The income shown in column 2 of this Table was derived from a calculation in which two requirements were met. The primary requirement was that as a whole it should afford a profit of 6 per cent over cost. The further requirement was that the income should be related to the output. In view of the output and its distribution in time, each unit when sold must afford an income of $1.6536 in order that as a whole the yield as received will afford a profit of 6 per cent compounded annually on $1,000. Let us consider that this 6 per cent rate of profit is also the appropriate rate by which to value such incomes. The depreciation in capital value taking place in the first year will be the difference between the initial value, or cost, and the value of the remaining 9 years' income expectation. It is the relatively small sum of $22.69, which is to be compared with the first year's depreciation indicated in Table III of $75.87. In both cases the amount of profit depends not merely upon the year's income, influenced as it is by the current output, but also upon the decline in capital value which has taken place during the year, that is to say the expense of depreciation. Now the valuation basic to the determination of this expense, like all other valuations, contains implicitly a series of capital values referable to future times. A present capitalization depending upon the income prospect implies a future capitalization depending upon the then remaining income prospect. These values are so related to the correlative current income and depreciation that the rate of profit in any year is approximately equal. Thus with respect to the tables, a 6 per cent rate of profit over cost is likewise a 6 per cent rate of profit over value at any time.

The principle of an equal and constant rate of profit is not a law of productivity or even one of value increase. It does not define physical facts. It has application only to the accountancy of values under conditions which must be assumed or taken for granted. It is the most convenient way of expressing the results of past operations over a considerable period. It is perhaps the only way of setting up the expectation relative to the future.

We particularly emphasize the fact that the constant rate of profit above referred to is in no sense dependent upon constant revenues. We consider as erroneous the assumption that expense is constant and profits variable in accordance with variations of revenues over such assumed constant expense. We have been at some pains to point out that such a result is produced by erroneous accounting. Yet there is a prevalent, deeply rooted idea that revenues in order to be reasonable ought to be constant, or, what amounts to the same thing, directly proportionate to plant investment. To take for granted this idea is to give to rate regulation an objective itself economically undesirable, and practically impossible to attain. It is not economically desirable to level off public utility revenues by advance adjustments in rates. Reflection will at once disclose that the volume of revenues received in a particular accounting period is not in itself an index of the reasonableness of rates. There is no reason why the price of service should vary in accordance with fluctuations in demand — that it should decrease with strong demand, and increase with falling demand. Moreover, an annual adjustment of rates which attempts to accomplish such a thing will shackle the business and its usefulness to the public with uneconomic fetters. The proper objective should be to propound stable rates in view of the factors of variable demand and varying output relative to the capacity to care for such demand. As

said by Mr. Justice Brandeis in his dissenting opinion in *Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission*, 262 U. S. 276, 308, "The prime needs of the community are that facilities be ample and that rates be as low and as stable as possible."

We shall next treat of the subject of plant capacity and of varying use thereof in relation to rates. We have no desire to argue the specific question involved in the findings of the court below concerning the fair value of the company's property during each year that the attacked rates were sustained, and the profit determinations for each of such years made by that court. The theory of capital cost distribution over extended accounting periods which we here advocate is, of course, not consistent with the basis of calculation used below. Our argument is directed to the subject of whether particular rates prospective in operation will result in confiscation. If the theory which we propound is worthy of approval, it should of course find application likewise to the determination of whether rate orders tested in their application over a reasonable period in the past would have been remunerative. We cannot subscribe to the thought that such a test is to be applied year by year upon the basis of a regard limited only to the revenues of the particular year.

VIII.

THE PRICE OF SERVICE IN VIEW OF FLUCTUATING OUTPUT AND VARYING USE OF PROPERTY

In testing the reasonableness of rates it is ordinarily assumed, in the absence of recognized abnormal conditions, that the past year's operations are representative of future conditions. The effect of this is to project into the future a forecast of a uniform annual expense and a

uniform annual income. We have indicated how unsound such ideas are. We have also shown that nothing in either physical or economic laws requires that output shall be uniform. The unwarranted assumption that it is so is an example of figures set down with "delusive exactness." But the fact of variable output, far from being accepted as the common case, has received attention only when capacity returns were claimed at a time when the output represented a quite limited use of the property. In legal development, therefore, the output question has been associated with the subject of "used and useful property."

The element of probable future earning capacity has been frequently mentioned in the cases. A consideration of this element ought, of course, to include regard for physical capacity of the property to furnish increased output when demanded; but the references to earning power have not very definitely recognized these features, and the cases have not resulted in the elucidation of correct principles. The recognition of a present output less than capacity has simply influenced particular decisions and suggested remedial palliatives for particular cases.[1]

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[1] In Smyth v. Ames, 169 U. S. 466, 546, the relevancy of the "probable earning capacity of the property under particular rates" was indicated. In Southern Railway Co. v. Kentucky, 274 U. S. 76, 81 (involving valuation for taxing purposes), it was said: "Much weight is to be given to present and prospective earning capacity at rates that are reasonable, having regard to traffic available and competitive and other conditions prevailing in the territory to be served." In Darnell v. Edwards, 244 U. S. 564, 576, it was said: "If the earning capacity of the railroad, present and prospective, really is as small as the appellant claims, it may be doubted whether the road is worth what it cost."

In Knoxville v. Knoxville Water Co., 212 U. S. 1, 15, attention was directed to the validity of a year's results as a sample. "The operations of the preceding fiscal year, or of any other past fiscal year, were valueless if the year was abnormal, and were only of significance as they foretold the future." In Willcox v. Consolidated Gas Co., 212 U. S. 19, 49-51, probable increase in the demand for gas, especially under the reduced rates,

We have had occasion to touch upon this subject in connection with the example of valuation under conditions of "increasing returns" (Table V, page 75). The railroad business was mentioned as one characteristically exemplifying this condition. Construction in advance of immediate requirements was also referred to. The most general aspect of the subject is indicated by the relationship between present and prospective output to present and prospective capacities.

We have already explained how utterly impossible it is to determine the cost of a single year's output without first determining the composite cost of the total output of which that of the current year is merely a part. The existing capital goods in a public utility enterprise substantially contribute to the production of an extremely extensive output. It is a matter of great difficulty, therefore, to identify precisely the total product of a presently existing plant. During the course of production, the plant itself does not stand in a stationary condition. There is an inward and outward movement of plant items. The more durable or backbone elements of the plant become

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was especially stressed as an element of high relevance. See also Des Moines Gas Co. v. Des Moines, 238 U. S. 153, 173. In Darnell v. Edwards, supra, the abnormality of the test period was strongly emphasized. See also Galveston Electric Co. v. Galveston, 258 U. S. 388; and Brush Electric v. Galveston, 262 U. S. 443.

Denver Union Stock Yard Co. v. United States, 57 Fed. 2nd, 735, represents excellent appreciation of the fact that a particular year's income is not a significant measure of profit. "Ordinarily a test period of five years or more, if available, is selected. * * * It is generally true that the longer the test period the more accurate the judgment for the future; the broader the base and the safer the estimate. When there has been a reasonably steady growth in the business and reason to anticipate that it will continue, the factor of growth should be considered in estimating the future. There is ample evidence in the record that a fair estimate of earnings for the future cannot be predicated upon an examination of a single year of the period; that in estimating earnings for the future the business world generally studies the earnings for at least a five-year period in the past."

interwoven with new additions, with the result that the total output to which the existing plant contributes is a joint product in part of the present, and to a considerable degree, of the future plant.

Generally speaking, property is acquired and plant items are installed with a view to the future expansion of output. Sometimes the installed facilities will, without substantial modification, care for the contemplated increased output, but usually expenditure for additions and adaptations is necessary. Proper engineering requires that existing plant shall be designed with reference to economical additions for future requirements. It is the object to develop a plant which, in view of the present and prospective demand for service, and the present and prospective costs, will represent the most economical means of delivering the required service. The importance of such considerations is of increasing weight in view of the longer lived and more costly items of equipment.

Such items constitute indeed the skeletal design of the plant. Its important requisite is that it shall be adequate not only for the present service but shall also be adaptable to the needs of the future. Its design, however, is not controlled merely by the arbitrary prescription that it shall be made of durable construction. It is given a durable and adaptable design because that particular plan is the most economical. The engineer must compare all the available means of rendering the service in respect to their first and ultimate costs; and as a result, he selects that kind and design of plant which, in view of all conditions, will result in the maximum of profit. It is, of course, not necessary to be able to visualize the exact constitution of plant at a remote period in the future, although it is perfectly feasible to make fundamental approximations having reference to plant composition twen-

ty-five or more years in advance. In many instances, when land is acquired or large buildings are constructed, the conditions for a practically unlimited period may be considered.

In the same way, when costs in relation to an output extensively distributed in time are in question, perfect accuracy in the forecast both of future output and of the future expenditures, which may have a bearing upon the costs of present service, is unattainable. But we may have fairly accurate knowledge concerning the maximum probable cost of a certain minimum output practically certain to be required. In this way working cost figures may be computed which are unlikely to be exceeded by the actual results. It must be remembered, however, that the demand for certainty in advance can never be met; the present and the probable future cost of service is always a matter of estimate; and the claim of confiscation must necessarily be resolved according as one estimate seems more or less probable in comparison with another.

The leading case which involved consideration of the existing installed capacity and the probable earning power of the future is that of *San Diego Land and Town Company v. Jasper*, 189 U. S. 439. The gist of the opinion is contained in the following quotation:

> "The supervisors, in determining the rates, assumed that the amount of water available for outside irrigation, apart from the amount used and paid for by National City, was enough for a little over 6,000 acres, and on that point there is no serious dispute. Then they fixed the rate as if the company supplied this 6,000 acres, although such was not the fact. Of course, the amount actually received for the water actually furnished was correspondingly less than the receipts as estimated by the supervisors upon their assumption. If there

were no force in any of the arguments for the appellees which we have passed by, the result of this mode of estimate might be that the appellant did not get 6 per cent on the total value of its plant. But here, again, we have to distinguish between Constitution and statute: If a plant is built, as probably this was, for a larger area than it finds itself able to supply, or, apart from that, if it does not, as yet, have the customers contemplated, neither justice nor the Constitution requires that, say, two-thirds of the contemplated number should pay a full return. * * *

"It hardly can have meant that a system constructed for 6,000 acres should have a full return upon its value from 500, if those were all that it supplied. At all events, we will not be the first to say so. If necessary to avoid that result, we should assume that only a proportionate part of the system was actually used and useful within the meaning of the statute."[1]

This decision is both correct and effective in repudiating an improperly planted claim. That claim, in logical essence, is to the effect that a remunerative profit must be realized in the income of each and every year; and

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[1] In Southern Pacific Co. v. Bartine, 170 Fed. 725, 767, a similar claim met with the following response:

"It does not necessarily follow that a schedule of maximum rates fixed by law is confiscatory because it fails to yield a reasonable return on the investment, above taxes, operating expenses and interest on the indebtedness. The rates must be reasonable to the company, but they must, in any event, be reasonable to the public. If a railroad is built into a new, sparsely settled territory with a view of serving a large future population and developing business, the Constitution does not require the few people and the small business of the present time to pay rates which will yield an income equal to the full return to be gathered when the country is populated and business developed to the full capacity of the road."

See also to the same effect, Boise City Irr. Land Co. v. Clark, 131 Fed. 415.

regardless of how many customers are being served, their payments must make up this total requirement. Such a view is erroneous and impractical, for it disregards both the technological facts of production and of output, and also the economic conditions of the demand for service and its value. The system was either in fact designed to have an increase in output, or the venture was misconceived. In all probability there was reasonable expectation of such growth in customers' demands as would justify the advance provision for a system capable of serving, say, 6,000 users. It was evidently contemplated that the demand should start at its lowest with the presently existing customers, and that it should increase. Now if the presently existing customers were required to pay rates which would afford a realized income equal to, say, 6 per cent upon the investment plus depreciation expense charges, then the effect of any additional output at a relatively small increment expense would enhance the profit rate. Rates would not automatically decline as demand increased; and regulation seeking thus to manipulate them is totally impractical. A rate, as a practical matter, stands for a period of years. If the rate, initiated at the low point of use, and hence a high one, were reduced when a full demand became manifested, the customers would receive highly unequal treatment. The rate would be high at a time when the burden on the customer would be most onerous; it would be disproportionately low for precisely the same service at a time when the customer had no need of the reduction. Owing to the necessary lag in attempting the rate adjustment, the utility will already have received more than the merely reasonable returns which it was intended to grant. In brief, the merely investment formula of an equal annual profit realized in the income does not fit the facts of a business.

To divide the property into a "used and useful part" as distinguished from a superfluous or not yet useful part is to resort to a fiction good only for remedial purposes. It may well have been the case that substantially all of the property was in actual use. The lopping off of a part as not in use renders it possible to apply the equal annual income notion to the imaginary part which is deemed to be presently used and useful. The actual effect of such a procedure in fixing rates is to make them somewhat too low. It ignores the fact that, presumably, economies were effected by the advance construction, and that the cash expenditures incurred for this reason in advance must be compensated for.

In the case of *Long Branch Commissioners v. Tintern Manor Water Works*, 70 N. J. Eq. 71, this subject was approached from a somewhat different aspect, but one which still fails to cut loose from the fallacious notion that the annual profit requirement must be met by a corresponding income. The remedy there propounded was that the investor ought to be content with a somewhat lower rate of profit in the years of low output. It was said:

> "These considerations lead to the conclusion that the water company, when it starts with new works, or a large addition to the original supply, is entitled to an income therefrom somewhat greater than what is due to the cost of work sufficient merely to meet the present demands. I say 'somewhat greater' for I do not mean to be understood as holding that capitalists ought to expect an immediate compensatory income from an enterprise of this character. But, on the other hand, it would be manifestly unjust to expect them to invest their money in a plant necessarily larger than present demands require and take as an income therefor

such a sum as would satisfy an investment sufficient to meet present demands. * * *

"I have intimated that the defendant ought not to expect, at the start, a compensatory income such as that stated by Judge Williams in the Supreme Court of Pennsylvania, and by the Supreme Court of Maine above cited, but I do think they ought to get at the start a moderate rate of interest, say five per cent, on their investment."

The foregoing view is again a remedial palliative founded upon a fiction. The idea of a fluctuating income seems to be an anomalous exception, and is reconciled with the normal by the theory that under special conditions the rate of profit should fluctuate. But as we have shown, a variable income does not at all signify a fluctuating rate of profit.

The price of service is not independent of its value as delivered to the customer. The same service, generally speaking, should command an identical price regardless of whether the plant is operating at full or only partial capacity. If, therefore, an equal price per unit of service is fixed, which, considering the output as a whole, will yield a total income sufficient to afford a compensatory rate of profit upon value, at cost or other proper standard, each customer will be equitably treated and the utility will be fully compensated. The derivation of such unit price requirements is shown in Table V, Page 75. The income will, of course, fluctuate with the output and will properly stand in a direct proportion to the quantity of goods which is sold. It may be observed from the table, as has been fully expounded, that the rate of profit is nevertheless constant. The reasonable rate of profit afforded by charging a proper price per unit of service, if based upon cost or initial value, will result in the

same earning rate upon the value at any time, provided that no shift is made in the standard of value itself.

A rate structure is merely a set of unit prices for services. It is impossible to test its reasonableness unless regard is had for the total units of output which the property was designed to supply, and in all probability will supply. It must particularly be emphasized that a due regard for prospective output and the correlative factor of prospective income is not to be excused, and therefore neglected, merely because perfect foreseeability can never be attained. One who invests money, say in the construction of a large office building, is persuaded that he will be able to receive remunerative rents in view of the prospective demand for space. He may have a reliable estimate of the present demand, and he may feel warranted in spending extra money to enlarge the capacity of the building above that which will be filled by the immediately available tenants. Unless the expansion in use materializes within a reasonable time, and this depends upon the surplus cost of providing the additional capacity, such additional investment will be ill-advised. The plant development in the telephone business is most carefully planned in order that the most economical capacities will be installed in view of present costs and the future demand for service.

When the growth in demand for service proceeds at a rapid rate, naturally the margins of excess capacity existing at a certain date are relatively soon brought into use. In the meantime new margins will have been created to take care of the growing demand. However, the factors of cost and the technical conditions of plant construction prevent a nicely ordered plant development merely a step or so in advance of present demands. The conditions just referred to will dictate that for some

classes of plant the demands of a very considerable period in the future be anticipated, while for others only those immediately in prospect need be cared for. In selecting a site for a building it will pay to spend more money for the land than would be required for merely the next few years' use. The site must be located at the most advantageous point, price considered, in view of the service requirements many years hence. Like principles will dominate the construction of buildings to house general offices and central office equipment. Furthermore, the building itself is generally designed so as to be adaptable to enlargement. The actual central office equipment will contain considerable capacity over present requirements, together with provision for additions at relatively low cost. The economies of advance provision in respect to outside plant tend to shade down, although conduit will usually contain more runs than are filled, cable more circuits than are in use, while poles are set, when the occasion demands, of sufficient size and strength to accommodate prospective requirements in the way of additional cross arms and wires.

The elements of capacity and use become all the more important when there has been a slowing up of the demand for telephone service. A plant adapted for the permanent conduct of business is naturally subject to cyclical fluctuations in use. Construction is not of necessity a continuous affair creating large plant margins not in use. As the demand stabilizes the use tends to approach a standardized capacity. These factors are of great importance in this case and have received no attention at the hands of the plaintiff.

Yet the elements herein mentioned are matters of daily attention in connection with the telephone companies' plant development. The anticipated demand of a par-

ticular community for telephone service is most carefully studied and reduced to plots and curves. The prospective revenues from each class of service and over periods many years in the future are carefully considered. The probable character of plant ten, twenty, and even thirty years in the future is held in view, and all of these studies are given a focal concentration upon whether it pays to make certain commitments in view of the future. The most important single document illustrating the basic elements involved in plant design and indicating the degree of refinement to which planning has been carried in the telephone business is the "Handbook of Outside Plant Engineering Practices, General," which is furnished by the American Company to the operating companies. This book was in evidence below but the writer does not know whether it is a part of the record upon appeal. He is warranted, however, in saying that its contents ought to be thoroughly studied by this court. A copy is available at the Library of Congress. This book reveals many subjects for which we contend, including the inaccuracy of straight line depreciation charges and the consideration of the subject of capacity and fill. Much of its contents is technical, and to explain its significance in words would require a considerable amount of space. Its formulas are, of course, set up with a view to practical use, and consist, in many instances, of calculation conveniences which do not reveal the fundamental economic principles which justify them. However, the book, carefully perused and properly interpreted, contains full admissions, as we have said, validating the practical nature of most of our contentions, and indicating that the presentation of a rate case in behalf of the company does not have the objective of revealing the actual economic conditions and requirements which attend this business. It is rather designed to take full advantage of the unfamiliarity of the

judge and of the representatives of the public with the facts, which are ordinarily exclusively within the knowledge of the plaintiff.

In attempting to present the claim that existing customers, whose use of plant facilities is not up to capacity, should pay rates so that the revenues will have a total as if the plant were subjected to capacity use, the company raises a question both of morals and of law. It knows of the existence of facts highly relevant to the controversy. Having a private knowledge of highly technical and esoteric facts, it ignores their existence. The proper response, legally, should be that no rate order can be declared unconstitutional unless, as tested by the actual plans and projects used in the business, the price per unit of service, considered with due approximation of total output, capacity, and variation in use, is clearly unremunerative. There is complete failure to make any presentation of this sort.

It must be remembered that perfect accuracy is no necessary part of such a presentation. It would not be practically difficult to show the degree of use by classes of plant relative to the total capacity of each class. Comparisons could be made of such indexes with the number of stations by class and with revenues per station. Even the investment per station from year to year will constitute a crude index of use relative to capacity. It will be seen that the investment per station has, during the depression, greatly risen, due to the station loss. A fairly accurate index of the use of toll plant relative to capacity could be constructed from statistical data.

It is an unfortunate element involved in the paradox of private industry and governmental regulation that the regulating authorities are, with a few exceptions, we hope, outsiders looking in. This disadvantageous position

imposed upon the public relative to access to the facts, appreciation of their significance, and means of marshalling them, should prompt this court to hold a complaining public utility to the requirement of clear and convincing proof that its constitutional rights are being violated.

The subjects of use relative to capacity, and of capital value and depreciation in view thereof, has an intimate connection, as we have before mentioned, with that of Going Value; but we defer discussion of that subject until the exposition of depreciation has been completed.

IX.

THE ECONOMIC SIGNIFICANCE OF SERVICE LIFE

1. Period of Service Life is a Result of Economic Selection

From casual appearances, property items may seem to have as attributes a certain endowed duration in service. To describe that duration as a "life" is to suggest an analogy between the service period for property, and the term of life for living beings. The analogy is, however, extremely misleading.

The distinction between a period in service and a biological life is aptly illustrated by property having both of these characteristics. A cow might go out of service by being sold to the butcher whenever her productive functions have so fallen off that the advantage of selling outweighs the benefits to be had by keeping her. A horse may have a period of useful service at one kind of work, and may be sold for future service at something else. Domestic fowl may be kept "in service" for eggs and stock; others may render no service whatsoever except when sold for the table. These examples are sufficient to

indicate that the "service life" of plant items is not at all analagous to a biological period of vitality. The actual service period of such an object is a matter of art—a result of human action. It depends upon the materials and the methods of its composition, and the relative advantage of disposing of it, over keeping it.

Service life as commonly understood means the period of use at the same location. The item may still be capable of further use elsewhere. The point of view is that of a particular productive process which begins with the installation of the item, and terminates with its removal. At removal, an extra cost may be occasioned, or an extra revenue may be had from the sale of the item. The latter income is salvage. If a net cost is sustained, it may be termed negative salvage.

As ordinarily considered, the termination of service life looks like an untoward event. The analogy sought to be shown between plant and human mortality is a source of grave error. It causes one to regard the termination of usefulness as a commercial detriment, and the chance thereof as a risk.

2. Physical Life.

Physical service life is not analogous to the biological, for it is possible in many instances to give great extension to the former by the expedient of repairing. The limit of physical life is reached when further service without repairs is impossible, and it no longer pays to make them.

The potential physical service life is always an important factor to be reckoned with when retirement is contemplated. It represents an existing reliable stock of services, bought and paid for and not to be thrown away unless the retirement is an incident to an economically

superior project. The value of an item on the hypothesis of its remaining in service for its physical life, ascertained by its value new, less an allowance solely for physical deterioration, is commonly termed "structural value."

3. Obsolescence.

Retirement purely on account of obsolescence is a somewhat rare occurrence. Let us consider a simple hypothetical example illustrative of the conditions which at least raise the question of obsolescence. The example which we shall apply is purely hypothetical, for conditions so neat will never occur in actual practice.

A manufacturer has a certain machine on hand in a condition as good as new. He is advised, however, that it is obsolete because there is now available at half its cost a new machine of different construction which is a perfect substitute for the one he has: it operates at the same cost, produces an identical output with equal efficiency, will last precisely as long, and will have the same junk value. Should the present machine be retired for obsolescence? Obviously, the effect of retirement and replacement with the new machine will be simply to have duplicated the identical services and the identical income which the old machine would afford; but the burden of a further outlay will have been incurred. It is clear that the mere relative cheapness of a new machine can never be a cause of retirement; for the old machine will be worth, subject to deterioration, as much as the new. To carry the example a step further, let us suppose that the new machine can be operated with such economies as will first recoup with interest the new outlay required to make the substitution (this outlay is the cost of the new machine less the net salvage realization of the old), and then leave remaining the same income as could be had with the old.

This circumstance, if risk can be disregarded, will only serve to make the choice even, and will still offer no positive advantage in making the change. A qualification may be indicated. The rate of profit reasonably to be expected in the particular business may be sufficiently attractive to justify new outlay in order merely to obtain it in preference to some other and lower rate which the capital could earn elsewhere. If funds are available pressing for employment, to obtain the normal rate of profit on such new outlays may be preferable to seeking another investment. If the outlay must be financed from new funds, the comparison is between the market rate of interest and the rate of profit expected in the business. Ordinarily, in an expanding business the demand for new capital is such that plant items are not displaced merely to afford employment for more capital, but because appreciable savings will also result.

We may now summarize the conditions of retirement purely for obsolescence: The new article must at least substitute for the services, (and hence the income) of the old; it must also within its period in service, afford recoupment plus interest for the further outlay; and it must have operating advantages in addition, so as to provide a further income to induce making the change.

We have mentioned as one of the requisites that the superseding machine shall at least render the same services as the old. What service life is contemplated? Obviously, subject to a qualification which we shall mention, the physical service life. This is only to say that the superseding machine must, after rendering amortization of, and profit upon, the new outlay, be capable of rendering recoupment and profit upon the value of the machine to be retired, for its value will include the probability of its remaining in service for the maximum period. Now it

may happen that, pursuant to a major plan, the present machine is slated to be retired before the probable expiration of its physical life. In this event, its hypothetical physical life would seem to be irrelevant to the present comparison. But in formulating the major plan, which thus foreshortens the machine's service life, this maximum must have been considered in order to determine that the plan actually adopted had an advantage. At bottom there is presented a fundamental choice between maintaining existing units and substituting them with new ones; and if in a particular case, the hypothetical physical life of the existing unit is ignored, it is because it has previously been considered.

4. Inadequacy.

Similar economic considerations for the most part determine retirements on account of inadequacy. As a general rule, the means adopted to increase the output result in a reduction in the cost per unit of service; but there are doubtless exceptional cases in which plant expansion is made under public requirements which have the result of increasing such unit costs. Even when expansion is compelled by reason of demands for service, and retirement is made as an incident thereof, it does not follow that the measure of the loss incurred is the structural value of the unit retired. The apparent detriment forced by the removal of the unit may be in part offset by taking advantage of the occasion to effect unit cost reductions through larger or improved units. The result of the sacrifice caused by the expansion will depend upon the facts in each case. In short, the measure of both the gains and the losses through the process of plant development is always a question of fact. Public service companies have a motive in failing to disclose the fact that

such gains are constantly made and the magnitude thereof. The subject is one of an intricate nature and is likely to become a matter of sharp controversy in litigation. In the past the tendency has been to emphasize the loss side of the picture and to suppress or fail to perceive the gain side.

The fact that the rate of profit may decline as a result of plant expansion by no means indicates that the process of development and retirement results in losses. Capital will seek investment in the business so long as the expected rate of profit upon the new money will represent a better premium than the readily available market rate of interest. A larger volume of profit at a lower rate per dollar of invested capital may be preferable to a small volume at a high rate of profit. The existence of demand is obviously a condition of plant expansion but it is by no means a loss producing factor. We emphasize the fact that retirement for inadequacy takes place as an incident to making a profit from supplying the increased demand.

5. The Relation of Service Life to Expense

If the particular property item is the unit of value, obviously its entire worth is necessarily consumed in service within its life period. It would therefore seem to follow, subject to such qualification as would arise from an unequal distribution of use over time, that the exhaustion of service life would serve to measure the accrued consumption of value, and hence the expense of depreciation. We have already considered the subject of depreciation from the point of view of regarding a single item as an enterprise, which is initiated and comes to an end in complete liquidation when service life expires. But it was pointed out that the service life concept was subject to considerable qualification. What is true of the enterprise

itself is not necessarily to be applied to the several plant items taken singly which contribute to it. Now the plausibility of the service life concept itself comes about by implicitly assuming that, for purposes of valuation, plant items may be likened to miniature complete enterprises. The specific plant item is not, as part of a going business, a satisfactory unit of value.

The separate and isolated existence of the unit actually ceased to be a fact when it became incorporated into the plant. Thereafter, its value becomes manifested not in terms of an output proper to it alone, but rather in the contribution of its services to producing the income of the business. The customer purchasing, say, electric power, is not in any actual sense paying for the services of a particular generator. Nor can he be conceived as making any contribution toward its maintenance and the recoupment of its cost or value. In purchasing the services of a public utility he buys the end product created by means of many subsidiary services. Each plant item makes a contribution in furtherance of the ultimate product. Each plant item is in reality a joint contributor to a practically continuous stream of services, the value of which is manifested in terms of what customers pay for service. What has been said concerning joint production is applicable to a proper consideration of how the specific plant item is related to the enterprise. It is not entirely logical to take the position that, when a unit has been retired for obsolescence or inadequacy at the end of five years, a burden of compensation during this period was actually thrown upon the past revenues. In fact, it is largely a gratuitous assumption that a fully compensatory income needs to be allocated to the retired item by the time its life expires. There is certainly nothing in business practice which imposes such a requirement or makes it even practical.

In considering the expense of depreciation in the true and actual sense as distinguished from merely arbitrary liquidations which may be shown upon the books, the primary factor to be first regarded is the income, since both value and value loss must depend upon the prospective income stream and the difference in its character as between two time points of view. Depreciation, therefore, will depend upon what the proper price of service should be. But it is very commonly supposed that the reverse is the case, and that the proper price of service should depend upon what the annual depreciation is. Our discussion of the principles of valuation thus far should have sufficiently clarified the point and satisfactorily demonstrated that value loss is not a primarily given and independently discoverable quantity, but is relative to the prospective income stream and its diminishing worth. Therefore in considering whether or not a particular property item is a proper unit of value the question to be answered really is whether it is desirable in the first place, and practical in the second place, to set prices for service which during the actual service life of plant items will be neatly responsive to the demands of compensation item by item.

6. Rates is View of the Service Life Theory.

Should the price which customers pay for service be so adjusted that a sum sufficient to cover cost or value plus profit equitably distributed over the service life of the several units may be recovered during service lives? This interrogation itself challenges attention to the question as to whether the income of a business may be correlated with its mechanical and structural parts. By what means or process can rates be made sensitive to plant changes so that when a unit is retired it is certain that customers have just completed the final touch toward molding their

payments to fit the life and mortality of the structural unit? Reflection upon this question will be persuasive that such a neat relationship cannot exist in fact whether or not it be desirable.

Before pointing out the specific tendency of the service life theory to operate detrimentally, it is advisable to set forth an example in figures so that the discussion may be centered around definite points of reference.

Concerning this example, some preliminary explanation is necessary. The example must represent as defined that which is in fact indefinite. Even though, in actual rate regulation, the implications of the service life theory are not carried into effect, the propriety of the theory must, nevertheless, be tested in view of its perfect application. By perceiving the theoretical requisites of the proposition, we may then determine whether it may actually find application. In our opinion, the theory itself is simply a rate-fixing formula which only affords a rule of thumb to set rates which are in fact arbitrary. The rate so determined does not in fact perform the functions which constitute the implicit basis for the theory. The example, therefore, is of conditions which would exist if a price for service were charged, which during actual service lives, would meet the requirement of amortization and profit item by item. At the date of retirement, the item is supposed to be analogous to a completely liquidated enterprise, which has, with fairness to all customers, produced enough to cover its cost and to yield a reasonable profit to its owner.

The example must be complete as to relevant detail. It must include every element necessary to an economic analysis of the problem. In short, it must show the dollars and cents involved in the retirement transaction. It

will therefore serve to recapitulate in figures what has been said concerning the nature of obsolescene and inadequacy, and will demonstrate the fact that retirements based thereon are merely incidental to plant development in view of due economic selection.

Let us suppose that there is brought into question whether, in view of the existence of an advantageous substitute, a particular plant item should be retired. This presents a choice in respect to two optional modes of conduct: to retain the existing item, or to retire it and to substitute the new one. The choice will be resolved upon the basis of which alternative is most economical. It is necessary to consider, therefore, the financial difference, in detail as complete as may be convenient, between one and the other alternative. What has already been spent for the existing item is completely irrelevant to the determination in view. The comparison must be made purely upon the basis of future advantage as between retaining the existing item and replacing it with the new.

The present item, let us suppose, has a hypothetical physical service life for ten more years. At the end of that period it will render salvage of $50. But if substitution is made, an immediate salvage realization from the present item of $300 can be had. In addition the new item has an operating expense advantage over the old of $150 per year. Furthermore, the new item has a hypothetical physical service life of 15 years. Nor is there any great probability that an even more efficient article will soon be developed. The new item has an expected salvage realization of $50 at the end of its physical life. These benefits must, however, be offset by the detriment consisting of the first cost of the new item, say $1000, and the loss of the ultimate salvage upon the old.

The benefit and detriment involved by the plant change may be set up from the present point of view, regarding the future. The items of benefit or detriment expressed in monetary terms must however be reduced to a comparabl basis in view of the fact of time differences in their realization. Conditions which are common in either event do not need to be considered, since the exercise of the option does not alter them. The benefits and detriments involved in the retirement and substitution may be tabulated as follows:

	Present Worth	
Benefits		
Salvage immediately realized	$ 300.00	
Saving of $150 in expense for 10 years	1,104.00	
Value of surplus services of new:		
Income of years 11-15 at minimum of $100.81* annually	237.12	
Salvage at $50 at year 15	20.86	
		$1,661.98
Detriments		
Outlay	$1,000.00	
Salvage of $50 to be realized in year 10, foregone	27.92	
		$1,027.92
Balance in favor of retirement and substitution		$ 634.06

*This figure results from an estimate that the substitution will not involve a compulsory rate reduction dur-

ing the extended service life period below a level based upon a first cost of $1000, a physical service life of 15 years, ultimate salvage of $50, and approximately constant use throughout. Under these conditions the requirement to yield 6% is the above figure.

It is thus seen that by retiring the existing item and substituting the new, a gain, worth in present money $634.06, may be had. In addition, the substitution offers the advantage of employment for more capital, to the extent that this may be an advantage. The foregoing figure, however, must be taken as merely a probable approximation. There can be no guarantee that this advantage will in fact be realized. It may in turn be discounted in relationship to various possibilities; for example, the general state of the arts may be indicative of the fact that improvements in equipment of the character in question are in the offing. Under certain conditions, it might be better business to await future developments. There are frequently many factors of chance and risk which cannot be conveniently expressed mathematically, but which, in close cases, may influence the choice. Subject to such qualifications, plant development actually proceeds largely upon the basis of the above mentioned considerations and comparisons. Though the exact eventualities are unlikely to be precisely foreseen, still, action is taken in view of minimum, maximum, and most probable expectations.

The example illustrates in detail the economic considerations behind most retirements for obsolescence and inadequacy. A particular property item is incidental to the conduct of the business as a whole; it is maintained or sacrificed in accordance with what is best for the business. In view of advantages ultimately to be realized, the item

itself is made to depreciate down to salvage value. Herein lies a paradox which, however, can be fully reconciled if regard is had for the change in the point of view from the item itself to the enterprise. From the latter point of view, which is indeed the effective one, the value of the item as such is irrelevant. It may pay to annihilate it. If so, the completed transaction in which the retirement figures merely as an element, has an appreciative rather than a depreciative result.

A strong force prompting the plant change is the ability to appreciate the worth of the business by means of the advantageous substitution of plant items. For the case covered by the example, it is clear that a saving of $634.06 will be available on account of the change. To the extent that the existing rates are maintained, this saving will fall to the enterprise. If rates are not to be readjusted on account of the cost reduction effected, it is clear that immediately upon making the change the enterprise has sustained a gain in value of $634.06. Likewise, it must be indicated that the change might not be made if all of the advantages thereof had to be passed on to the public through the medium of reduced rates.

The proponents of the service life theory argue, in support of it, that the economies of the substitute plant item are all passed on to customers—an absolutely false proposition.

In order to set up the revenue requirement in view of the complete application of the service life theory, additional data are necessary. We need to know the cost of the existing item, its age at retirement and the relative annual volume of output throughout the total period. We shall assume that the original cost is $1000; and to avoid conflict with reproduction cost theories of value, we shall

also assume that the reproduction cost does not change. The assumption in respect to output will be that it is constant annually. The age of the property at retirement—its actual service life—will be assumed to be five years. The problem then becomes the following: What is the equal annual income requirement to afford a profit of 6% in view of a cost of $1000, a service life of five years, and a salvage income of $300? By the methods fully explained in connection with the Valuation Tables, this requirement is found to be $184.18. The price of service will therefore need to be this amount increased by the annual operating expense. Let us assume that the operating expense (not including depreciation) is $400 annually. The revenue requirement, therefore, during the service life of the present item is $584.18.

Upon the retirement of the existing item, when it has been in service a period of five years, the rate will need to be changed, if equity is to be done as between the utility on the one hand and the customers collectively on the other. Under the conditions of the example, the compensatory revenue requirement to yield a profit of 6% and to amortize the cost of the new item during its service life, will be $350.81 annually, composed as follows: The income requirement from service to yield a 6% profit on the first cost in view of the 15 year service life and the salvage is $100.81 annually. Since the annual expense is now $150.00 less, its amount is $250.00; which, added to the requirement for amortization and profit gives the total revenue requirement of $350.81.

It is seen that the service-life theory, if logically applied in fixing rates to yield a merely compensatory income, will cause the price of service to take on special characteristics. The picture is not complete or represen-

tative unless the purview is extended over a considerable time period. If perfect forseeability is assumed, the rate must be made to change with the inward and outward movement of plant items. In anticipation of early retirements due to progress in the arts and growth in the demand for service, the charge while the initial item is in use must be high, since its cost must be amortized, and profit thereon must be earned during its actual service life. But the greater this progress and growth, the more onerous the burden upon the present user. In attempted justification of the high rates thus resulting, it is said that the books on the old item must be closed, so that the new may start out with no drawback from the past. At the moment of the plant change, a new rate must be instituted low enough to pass on to the public the savings effected. To conform with theory, the price of service will start high, and drop to lower levels with major plant changes.

This requirement of frequent rate adjustment is practically impossible to meet. It is impossible for a commission to be sufficiently well informed to be in a position to enforce the reduction with the necessary promptness. An industry in private hands does not rush to disclose, and thus to throw away, its profit making opportunities. They are, in fact, kept secret as much as possible. Obscured by systems of accounting and claims for depreciation, they are elusive even to the intelligent and the vigilant. A knowledge of the business, particularly of its most important aspect, namely its probably future, is for the most part, private to its management, and is kept so. The routine accounting statements usually required do not comprise an analysis of the business sufficient for the purpose. Accounting science and economic analysis have not progressed sufficiently so that a general body of ap-

proved principles is at hand. At the present stage the usual analysis is based upon a series of underlying conventional assumptions which we believe to be replete with error. At best the possibilities of plant development and cost reduction can be fully appreciated only by those on the inside. Ready disclosure cannot be expected, and discovery is difficult and uncertain. A level of rates, once established, tends to perpetuate itself.

As a practical matter, the refined adjustments required by the service life theory are not made. The rate order actually outlasts a considerable part of the property in existence when it was made. It will run over into new cost conditions without adjustment. In actual practice, rate revisions are infrequent. For the same utility they may be spaced five to ten or more years apart. As a result, the economies effected through the process of substituting more efficient productive goods are not passed on to the public.

In consequence, it is highly profitable for a utility to establish as a basis for computing rates, short service lives. Their use tends to establish and to maintain a high rate level. It has been thought, however, that the merits of the service life theory depended upon whether it was possible to forecast accurately the duration of the goods in service. Though inaccurate forecasts contribute to error, they are not always the principal cause of it. Mere accuracy in service lives at the time the rate is instituted will not serve to keep rates constantly adjusted in accordance with the new economies to which the actual service life is incidental. An accurate service life represents only the detrimental side of the picture to the exclusion of the more than offsetting benefit side. Charging the public with the detriment and failing to credit it with the benefit naturally results in excess profits.

The measure of the excess profit depends upon the differential between the rate requirement before and after the plant change, and the length of the overrun of the existing rates. In the example, the differential is $233.37. An overrun of, say, two years will produce excess profits of 23-1/3% based on plant cost. Spread over the period of fifteen years, this excess will raise the rate of profit to approximately 10%.

The service life theory gets its plausibility from the delusive idea that each item should, in a sense, be self-sufficient, and should pay its own way, presumably out of the direct services which it renders to the customer. Such a simple analysis of the business into immediately tangible objects makes a strong appeal to common sense; but dominant realities cannot be thus brushed aside. In applying the service life theory, the impossibility of segregating the item becomes immediately apparent. No attempt is made to correlate the item with services to the particular customer and to fix rates on the basis thereof. Instead, the service life actually used pertains to a group of items of like kind, without regard for the fact that the services of many may be devoted to only limited groups of customers. In thus classifying items of property, the substance of the service life theory is thrown to the winds.

A large sized power or telephone company, for example, will have far flung pole lines. A particular user may be served by a line of poles having conceivably a service life of thirty years; but the impossibility of classifying users according to the life of the property which serves them is at once apparent. Upon an adjacent street the poles may have a life of only ten years. Accordingly, even the proponents of the service life theory must admit that the specific item cannot be given individual treatment. They

must perforce fall back upon the class. As a result, the price of service, theoretically of course, is set to provide amortization of all the poles. The user of the thirty year poles is charged on account of the short lives of other poles; while those served by short lived poles are relieved.

A community of interest as between all the users of the class of property is thus recognized even though no customer makes a direct use of all items in the class. The inward and outward movement of these items will not take place in any regular order; as, for example, according to age. The movement is constant, in both directions—inward and outward. Perhaps many of the existing poles will last upwards of forty years; on the other hand, some not yet placed, may reduce the composite life, because they will last, say, for only five years.

If community of interest between present and future users is recognized as a basis of spreading capital costs, it must also apply to distributing economies in operating expenses. Calculations of depreciation expense based upon the probability of short service lives on account of prospective obsolescence and inadequacy result in great unfairness to the public. Such forecasts do not genuinely signify that a so-called expense of retirement is immediately to be encountered. On the contrary, then denote that operating economies are immediately in prospect so that the cost of service will be less by retiring the item and substituting something else for it, than would be the case if it were left in plant to last out its physical life. If, however, the prospective operating economies are to be ignored, then when rate calculations are made, the shorter the service life, the higher the apparent expense, and the less adequate the existing rate seems to be.

The predictability of service lives argues absolutely nothing in favor of the validity of the service life theory. In *Depreciation Charges of Telephone and Railroad Companies,* 177 I. C. C. 351, considerable attention was devoted toward justifying the use of the service life theory on the ground that services lives were predictable. But if service lives are predictable, then the fact of substantial operating economies through plant changes is likewise predictable and should enter into the determination of proper rates. It must, however, always be remembered that the investigation referred to dealt not with rate making but with bookkeeping.

The tendency of past experience, whether subject to statistical analysis or to the interpretation of judgment, is in favor of short service lives. We venture the opinion that a forecast based upon the experience of retirements prior to 1930 will propound service lives considerably shorter than will actually be realized in the future. The principal causes of retirement—growth in demand and technological improvements in the arts—were operative with especially great force throughout the decade of 1920. Indeed, the half century preceding 1930 probably comprised the development stage of the industry. A projection of the trend of retirements represented by the experience immediately prior to 1930 produced forecasts for the ensuing ten years indicative of equally short service lives. The management itself was persuaded that the decade of 1930 would be characterized by a similar rate of growth involving large and rapid retirements for which new plants would be substituted. Plans for this movement were already formulated and some projects were under way.

We have indicated that an accurate forecast of service lives in itself does not protect against the vice of the

service-life theory, and we have no desire to give the subject the appearance of importance by concentrating discussion upon it. However, in our opinion, the actual evidence brought forth to sustain the predictability of service lives is of too limited a character to be wholly persuasive.

Statistical methods as usually applied overemphasize present trends and minimize the probable limitations upon them. When the demand for service grows at a constantly increasing pace, nothing in the statistics warns that the rate of growth cannot continue. Furthermore, increasing business itself creates an optimism which will not heed caution concerning a limit. Growth and progress seem to be unlimited. Plans in anticipation of continued expansion are made, and they have the approval of judgment. But both growth and progress are self-limiting factors. The tendency toward growth of population must come to an end. Likewise the concentration of people within limited areas must reach a limit. The standard of living cannot rise indefinitely. Furthermore the field of research is intensively cultivated, and it is natural to assume that each technological improvement narrows the scope of future possibilities.

The tendencies of statistical tabulations and of judgment based upon the actual experience of the past, coupled with a natural psychological predilection in favor of optimism, greatly favor the prediction of short service lives. To these weighty influences there should be added that of self-interest. Since a rate more favorable to the utility may be secured on the basis of short service lives, the prospect of early retirements is naturally entertained with favor. The tendency to underestimate service lives is one inherent in the usual forecast propounded by the

utility; and, though it may be questioned, the public does not usually have the means at hand to correct it. The very use of service lives as a basis for rates produces a standard too greatly within the control of the utility. Service lives in practice may be suspected of bias in the direction of shortness.

The financial effect of errors in this direction is very considerable. When the expected age at retirement is relatively short an error of even one year makes a large difference. For purposes of comparison, the income requirement may be regarded as an annuity to be realized during the expected service life. With interest at 6%, the requirement upon a six-year service life is 20.3% of the initial value, while the use of a five-year service life increases the burden of revenues to 23.7%, an increase of 3.4%. As the life lengthens, the effect of an error of one year progressively diminishes. The requirement for an eleven-year expectation is 12.7%, while that for ten years is 13.6%, a difference of .9%. For sixteen and fifteen years the requirements respectively are 9.9% and 10.3%, a difference of .4%. The difference between the requirements of twenty-one and twenty years is reduced to .2% whereas that between years thirty-one and thirty is less than .1%.

The above mentioned defects in the results brought about by the use of the service life theory indicate the nature of the corrective substitute. The primary defect, which imposes the theoretical requirement of prompt rate readjustment, is obviated by a standard of regulation which makes the level of rates more nearly constant, both in theory and practice, over extended time periods. Indeed, the ideal conditions are those of perfect forseeability, in which not only the retirement, but the con-

comitant economies could be foreknown. The ideal charge for service would be an equal amount to all the customers over the period; but since such perfection in foresight is impossible, rates must be fixed upon the basis of the reasonably probable conditions to be anticipated.

7. Hypothetical Physical Service Life as a Standard for Depreciation.

For this purpose a standard is readily at hand, derived from the very facts and principles of economic selection. We have seen that the theory of amortizing through rates the cost of property retired during its service life ignores the benefit side, while stressing the detriment involved in the retirement. The retirement itslf will ordinarily be influenced by the comparative advantage of removal and substitution, over letting the item remain in service over its hypothetical physical service life. Thus, we may perceive that a price for service designed to realize profit and amortization of cost over the hypothetical physical service life will be a maximum which the prospective economies (to the extent that they can be computed) will be available to reduce.

In formulating rates in which the factor of physical service life is regarded, the physical unit in and by itself cannot be taken as the unit of value. Since we brand as fallacious the theory that amortization and profit needs to be complete and perfect for each item at retirement, we must show the due procedure and rationale of burdening the enterprise itself, rather than the item for the return of cost and profit. The view of the business merely as a collection of independent items is so persistent that the question is asked—"Why burden other items for such unamortized cost and unrealized profit as remains at retirement?" But this again is to make too much of the

item view. Equities do not run in favor of the several plant items for they themselves are only incidental to the rendition of continuous services to customers, at an equitable price. In securing such an equitable price, the group of customers as a whole—and not merely an instantaneous cross-section of it—has a community of interest. The burden of cost and profit must be equitably distributed to this group through the price of the continuous service which it uses. It will be seen that this view makes necessary a revision of the idea that the essence of property value is residual in the physical items.

Let us assume for the moment that a new plant is installed and rates are fixed to afford profit and recoup cost over the hypothetical physical life. The possibility of retirement in advance is recognized, but only as a possibility. For the present it is not possible to calculate an economic advantage by advance retirement and substitution. Turning to the example we have used, the income requirement (amortization and profit) is $100.81. The annual operating expense is $400, making the revenue requirement $500.81 annually. This is to be compared with the figure of $583.87—an amount 16.7% higher—which is the requirement under the service life theory.

At the end of five years the advantage of retirement and substitution become definitely manifest. The existing item is retired; and the new is substituted. To start a clean slate with the new item and to base rates purely upon its hypothetical physical service life (which, in this case corresponds with the actual) *will not do.* A full compensation for the initial investment would not be rendered. We have seen that to have charged the initial customers a higher price would not have been proper. The rate to them was on a reasonable basis, and the bene-

fits of the plant change run wholly to the future user. Indeed, it may with justice be said that the existing structural value of the item, less the salvage, is dispensed with for the benefit of the future user. The price of service to him should therefore include compensation for this otherwise uncompensated for sacrifice.

The example which we have set forth is reduced to the simple terms of two items and therefore is not entirely typical of a continuous business. Since the example is limited to a single replacement, the possibility of further cost reduction by continuing the process of substitution is excluded. In an actual business either the prospect is that the substituted item will last out its physical life, like our example, or there is reason to suppose that it will be subject to a shorter service life on account of prospective economies. In every instance the utility can afford to reduce the rates in the face of heavy retirements. We have also seen that as a practical matter the economy is likely to be in force long before a compulsory reduction in rates can be effected. The utility is therefore likely to receive a more than sufficient opportunity to amortize any uncompensated for costs through the operating economies which it is enabled to institute before rate reductions. However, it would be manifestly unfair to fix rates after operating cost reductions had been effected, on the basis of the assumption that a clean slate is to be started with the new item and the utility was bound to protect itself against this kind of rate regulation by making the previous rates provide compensation during previous service lives. This doctrine is simply the service life theory over again.

The right to amortize the structural value of the retired item seems to us to be clear. *Pacific Gas & Electric Co.*

v. San Francisco, 265 U. S. 403. The operating advantages of the substitution will still permit a reduction in rates even though they bear a burden for such amortization. That burden is to be distributed over the hypothetical physical life of the new item. So distributed it will be so small an amount annually as to be almost imperceptible. Furthermore, the influence of prospective economies should be regarded. The remaining burden of amortization will not be, in the form of an annual amount, enough to influence a decision in a rate case.

To return to the example: The present structural integrity of the item retired may be measured by the figure of 66-2/3 per cent, on the assumption that the condition at which retirement is forced equals zero.

As we have seen, physical condition is not synonymous with value. It is necessary to evaluate the remaining two-thirds of the hypothetical physical life, considering likewise the salvage. The income requirement for the physical life, salvage considered, is $100.81 annually; and since the remaining life is ten years, the present worth of this income is $741.97. This figure, which measures the structural value of the item at retirement, also measures the amount of cost which has not been amortized in rates.

The burden of further amortization to be met out of rates is simply computed. The actual market value of the item when dissevered is indicated by the salvage realization—in this case, $300.00. There remains, then, $441.97 as of the five-year point to be compensated for out of the services of the substitute item.

The replacing item, having the same cost and hypothetical physical service life as the initial one, sets an income requirement of $100.81. In addition a present worth of

$441.97 is to be compensated for out of the stock of services. This burden in terms of an annuity of equivalent worth, over 15 years at 6%, is $45.52. The total income requirement is therefore $146.33. Since the operating expenses are $250.00 per year, the annual revenue requirement from service is now $396.33. This sum is to be compared with the prior annual requirement of $500.81.

8. Approximation of the Requirement for Depreciation and Return.

The valuation tables, particularly Table III, will have demonstrated that in the case of progressively depreciating property annual depreciation and annual profits are each of them variable rather than constant; but that the addition of these variables results in a constant annual sum when output is constant. For broad general purposes, particularly in making estimates to be taken merely as approximations, the assumption of constant output may be made, since the probability of variations in both directions is thereby equated. In measuring the annual requirement for depreciation and profit over a long period, this point of view may be adopted. We have shown that amortization burdens should properly be distributed over periods as long as the hypothetical physical service life of the property. It will be found that a composite physical service life for telephone property will be quite long, probably considerably in excess of 35 years.

Annual amounts providing depreciation and profit over lengthy periods do not greatly exceed the standard rate of profit or interest. Profit and amortization in equal annual payments over 35 years to render 6 per cent of a principal sum will only need to be 6.9 per cent of such sum annually. Thus it may be perceived that the factor of depreciation in the public utility business may be re-

duced to a minor figure. Indeed, as the period increases over which the income burden is to be spread, the rate for the income tends to approach the nominal rate of interest, a fact which is illustrated in the following table:

Life	Annual Income Requirement, %
30 years	7.26
35 "	6.90
40 "	~~6.90~~ 6.65
50 "	6.34
60 "	6.19
70 "	6.10
100 "	6.02

A public utility engaged in a type of business which for practical purposes can be considered as permanent, (60 years in the future is enough) receiving an income (depreciation and return) of, say, 7 per cent, is actually earning a profit somewhat in excess of 6 per cent. This is sufficient to show the extent to which claims for depreciation expense have been exaggerated in this case. The actual charges to depreciation expense in a Bell company exceed 5 per cent of the book cost of plant. This claim, added to that for profit, results in an annual claim of income amounting to from 12 to 14 per cent of book cost. It is still further increased by the use of a reproduction cost rate base. The justification thus to swell the price requirement for service depends upon the hocus pocus of the straight line method, taken in conjunction with the theory of amortization during service life. It is of the utmost importance for the just regulation of rates that the fallacies in these theories be exposed.

Depreciation expense applied in testing the propriety of rates is to be carefully distinguished from the debits or charges to depreciation expense in keeping a set of books. For the former purpose an assumption will need to be made concerning future operating expenses. To assume that they will continue at present levels comports with the assumption that the existing property will last out its hypothetical physical service life. These correlative assumptions will result in the propounding of a rate which is clearly sufficient. The future holds within it a high degree of probability that under rates thus fixed the rate of profit will be much larger than that assumed in the calculations. This result is likely to ensue because future operating economies will be available through the process of retiring plant items and substituting others in their stead. By virtue of the reductions in operating economies thus resulting, there will be income sufficient to amortize the cost of property retired, and, unless rates are reduced, to swell profits. Therefore it must be remembered that while it will be reasonable for purposes of rate determination to use a total income requirement of, say, 7 per cent to cover depreciation and return, the actual charges to depreciation expense in the future may still be large enough to amortize the cost of property retired, (allowing, of course, an extensive period in the future) because operating expense diminishes as retirements increase. It is extremely important fully to comprehend the fact that, except for quite unusual cases, a rate based upon present operating expense and an income requirement to be spread over the hypothetical physical life of property is a maximum figure. Prospective retirements, accompanied by operating economies, diminish rather than increase the requirement.

9. Depreciation on Acount of Obsolescence is a Result of Price Reduction Forced by Competition.

It is also very important to avoid confusing the marketing conditions pertaining to public utilities with those of competitive businesses. In the former, depreciation on account of obsolescence, is, generally speaking, entirely absent. In the latter, it is an ever present risk. Subject to value of service considerations, the public actually guarantees to a public utility a fair remuneration, a condition which does not exist in competitive businesses. If a competitor develops a more efficient mode of production by means of new appliances, the price of output is depressed, with consequent depreciation in the value of all capital goods engaged in such production. Generally speaking; public utilities are protected against such risks. Nevertheless, the service life theory is really based upon the existence of such a risk in the public utility business. The result, of course, is that the public is loaded with an assumed cost of this risk, while the object of the risk itself never happens to the utility.

10. Retirements for Inadequacy Involve Operating Cost Reductions.

The claim is frequently made by the telephone companies that retirements are brought about through the desire to render a more extensive service regardless of cost. Such a claim should, however, be supported by evidence. A perusal of the "Handbook of Outside Engineering Practices" will amply demonstrate that such a claim is utterly unfounded. Plant development does not proceed from that which is economically good to the company to something worse. The primary warrant for spending money in plant development is that more money can be made by instituting the project that by leaving things as they are.

11. Other Utilities Admit that Service Life Theory Results in Excessive Rates.

The service life theory does not have the approval of public utilities apart from the Bell telephone companies. The railroads have no use for it. Gas, electric, and water companies do not use it. At bottom its chief function is to justify high rates. See particularly "Concerning Depreciation," by Robert A. Carter, Vice-president of the Consolidated Gas Company of New York, a digest of testimony given before the Interstate Commerce Commission on November 22, 1923; also, "Depreciation Charges of Railroads and Public Utilities" by Robert A. Carter and William L. Ransom, a memorandum filed with the Depreciation Section of the Bureau of Accounts of the Interstate Commerce Commission.

We have before explained the distinction between the use of service life depreciation rates for purposes of accounting and their use as a measure of annual depreciation expense when rates are in question. We are concerned only with the latter element, and with this the recent findings of the Interstate Commerce Commission have nothing whatever to do. We are not disposed, therefore, to argue upon the limited subject of bookkeeping. In passing, however, we may mention that to claim as an annual expense an amount which does not even approximate correctness is not commercially healthy except for very strong businesses. The public takes the statement at face value, and a railroad which is compelled to represent its annual expense of depreciation at a high figure will seem to reveal great financial weakness. Of course, that weakness does not exist, but a great detriment to its bondholders and stockholders is very likely to result. A considerable part of railroad company difficulties today

is due to defective notions of accounting applied to the peculiar condition of fluctuating revenues pertaining to the business. Weaker telephone companies make a very poor financial showing when they are compelled to report high depreciation expense charges which do not exist.

12. This Court Should Not Permit the Service Life Theory to Become a Doctrine of Constitutional Law.

It is a matter of grave importance that the decision of this court be not interpreted as petrifying the service life depreciation expense theory as a doctrine of constitutional law. Generally speaking, commissions and lower courts do not make independent investigations of the enterprise with a view to ascertaining what the facts are, but instead attempt to apply to the regulation of rates decisions of this court upon facts as well as law. As a practical matter, this court has the responsibility of leadership. We submit that no rate order should be declared unconstitutional without most thorough consideration of the claims in respect to depreciation expense, even though the parties themselves do not dispute the service life theory. The public importance of the subject is so great that the Constitution should not be used as a means of sustaining rate claims unless the order attacked is shown to the satisfaction of the court to be clearly confiscatory. The technique of rate regulation and of testing the constitutional validity of rates is still in a formative condition. Each decision of this court is, however, accepted as formulating an essential principle of rate regulation inflexibly required by the Constitution.

X.

CRITICISM OF STRAIGHT LINE DEPRECIATION ACCOUNTING

1. Reservation of Income Cannot Create Expense: Writing Off Capital Value by the Amounts Reserved Produces No Correction.

Depreciation accounting has two aspects. The first is the charge or debit to Depreciation Expense; the second is the credit to Reserve for Depreciation. It is not essential that the first element be coupled with the second, for there is no necessary reason why the creation of a reserve should depend upon the simultaneous existence of an expense. A reserve may be designed to represent a portion of income held back from passing out as dividends in order that there may be secured protection against contingencies more or less likely to happen.

When, however, the measure of profit is in question, it becomes necessary to determine the actual value loss, relative to the standard of initial value, which has been sustained. Charging the amount reserved to expense raises, rather than settles this question.

The difficulty of measuring, period by period, the expense of depreciation is obvious. Such measurements, of necessity, involve contemporaneaus valuations which, as everybody knows, are highly unstable. But we have shown that in public utilities the element of depreciation is much smaller than is commonly represented. With very durable property, the annual value loss by reason of deterioration is of minor significance, and though we cannot measure it precisely, we may reduce to a fair approximation the combined burden for depreciation and re-

turn which should be laid upon the customer for service. This we have already shown.

The assumption is sometimes made that the magnitude of the debit or charge to depreciation expense is of no importance provided that the capital value be correspondingly written down. Protagonists of the public interest have concentrated great attention upon pointing out the injustice of failing to write out from capital value the depreciation expense charges. They do their cause much harm. They merely advocate a formal perfection in the performance of an operation itself erroneous and thus help to sustain the fundamental error of the method itself.

2. Use of Straight Line Depreciation in Rate-Determination has Practical Result of Imposing a Greatly Excessive Rate Upon the Customer.

The following table, comparable to Table III, will demonstrate the error of the straight line method when applied to rate making.

TABLE VI.

STRAIGHT LINE DEPRECIATION TABLE

1. Year	2. Accrued Depreciation or amortization at end of year	3. Book Value remaining investment or Rate base at beginning of year	4. Profit on Rate Base	5. Annual amortization and Profit (Income Requirement)
1	$100	$1000	$60.00	$160.00
2	200	900	54.00	154.00
3	300	800	48.00	148.00
4	400	700	42.00	142.00
5	500	600	36.00	136.00
6	600	500	30.00	130.00
7	700	400	24.00	124.00
8	800	300	18.00	118.00
9	900	200	12.00	112.00
10	1000	100	6.00	106.00

It is evident that this table practically can work out only upon one condition. That condition is indicated in column 5. Unless the price for service (less current expense) corresponds with the figures in column 5, the table will have absolutely no application. Now it is obvious that the price of service cannot practically be made to conform to the decline indicated in column 5. And it would be extremely undesirable from the point of view of the rate payer to subject him to such charges. A new property would place a burden upon him for depreciation and return of 16 per cent; in a property of average age, the burden would decrease to 13.6 per cent; a property in the last year of its life would only require the customers to pay 10.6 per cent. But at all times the customer has received the same service. It did not differ in value to him on account of the age of the capital goods used to produce it.

In fact, the price adjustments necessary to the working out of the straight line declension are never made. If its theory is applied in the determination of rates, the fairly persistent rate will be made to depend upon the age of the property at the time rates are fixed. If the utility is fortunate enough to have a rate case in the infancy of its property, the burden upon the customer, fairly permanently fixed, will be, with reference to the example, 16 per cent. Rates will only be fair if they are fixed with reference to middle-aged property. We believe that this is sufficient to reduce the theory of the straight line method to absurdity. It gains support because it is very simple. Anybody can understand it. It embodies the hypnotic power of simple mathematical ratios. Certainly, it is thought, if the service life is ten years, the value loss must be 10 per cent annually; and if this is the value loss,

the rate base must decline in step; and since the price of service is based upon the rate base it, too, should decline in step. Thus goes the logical pursuit of an erroneous premise. Most public utility property is young. The accrued depreciation for most utilities under the conditions of growth during the past decade, measured by the straight line method combined with the service life theory, will seldom exceed 20 per cent. For this reason those who have tried to benefit the public by insisting upon the method which makes the maximum deduction from the value new on account of accrued depreciation do not succeed in getting a tremendous reduction, and their argument supports the heavy annual depreciation expense charge which is the joker contained in the method.

The Bell System, however, is prepared to accept all of the advantages of the straight line method, rejecting at the same time every element of detriment which the method in strict theoretical application would impose.

It insists that the method is excellent to measure depreciation expense but that it is worthless to measure accrued depreciation.

A well maintained property will rarely have even as much as 10 per cent accrued depreciation. It is therefore extremely profitable for the company to advocate the right to burden the customer with the straight line, service life, depreciation expense charge, and likewise to burden the customer with a profit requirement based upon the value new less depreciation calculated on the basis of physical life or condition.

In order to produce this highly advantageous result the company admits somewhat more accrued depreciation than actually exists. The per cent condition as derived by the company is only the result of the straight line

formula applied in connection with the hypthetical physical life. As may be observed from Table III, the actual value decline does not stand in a direct relationship to the expiration of time. To condition property at, say, 90 per cent is only to say that the physical durability is impaired by 10 per cent. The value decline or depreciation does not correspond. By accepting a somewhat excessive measure of accrued depreciation the company is enabled to avoid telling courts and commissions more than it is good for them to know. It manages to keep within the straight line method, demanding that so-called service lives be used in the determination of depreciation expense, but that hypothetical physical lives be used when a deduction from value new is in order.

The validity of the straight line service life method is not to be tested by whether the reserves are sufficient to meet prospective retirements as they may occur. As to the service life theory, this test begs the question. And it may be conceded that the straight line method would not accrue more money than is required by the service life theory. The error consists in mal-distribution of the total depreciation (equal to cost, less salvage) among accounting periods. So far as the reserve is concerned, the error consists not of too much accretion, but of too early accruement. The vice of the method consists in its use to fix a price requirement for service,—16 per cent as in year 1, Table VI, whereas 13.59 per cent is alone proper under such conditions.

3. Demonstration of Error in Straight Line Method from Example of Merrimac Exchange.

In the appellants' brief a cogent criticism was made of average life figures for buildings and central office equipment. Although the initial structure and the equipment

installed within it will last for the life of the building, yet the depreciation expense of the present is based upon a much shorter average life. From time to time additions are made to the building and to the equipment, but the entire structure and its contents are retired at the same time. As a result, the average life is shorter than that of the initial construction and of the early additions. The use of the straight line method for determining the annual depreciation expense will impose an undue burden upon the revenue requirement whether it is calculated upon the basis of the actual service life of the existing property or upon a hypothetical average. However, the error which exists in the former case will be greatly magnified in the latter. The straight line method takes no account of the factors of time and interest. The prospect of spending a dollar fifty years hence is immediately converted into a burden as if the dollar were being spent now. This, too, the appellants' brief points out.

The burden of remote future costs in terms of present money is so slight that the matter of average service lives of the initial structure and its additions becomes of little importance. In other words, if the vicious straight line method is not used, and instead a correct burden is placed upon customers in view of present and future costs, that burden is not large enough to be the subject of argument.

This fact can be speedily shown without resort to intricate calculation. The average life claimed by the company for the Merrimac Building is, in round figures, 38 years. The equal annual income requirement to yield 6 per cent on cost over this period is 6.74 per cent of such initial cost. It is apparent that the enlargement of this burden is due primarily to the straight line method applied in conjunction with the average service life.

A more elaborate computation of the requirement per unit of service to yield a profit of 6 per cent will confirm the rough approximation above indicated of 6.74 per cent. The writer has gone through such a calculation. For purposes of simplicity he has approximated the expenditures made up to 1929 at $238,000 and considered them as made at the beginning of 1926. He has assumed that the output will be directly proportional to the cost of the building remaining in service, and has considered each thousand dollar's worth as representing a unit of output. By deducting the retirements at cost from the expenditures, the units of output produced will be indicated. The output will consist of 238 units to and including year 5; 380 units to and including year 18; 950 units to and including year 28; 1,035 units to and including year 38; 1,124 units to and including year 48; 1,177 units to and including year 58. In view of this output and the outlays required to produce it, with due allowance for salvage, what will be the price requirement per unit of service? This was computed by methods like that shown in connection with Table IV. The unit price requirement thus found was $67.90, which is the income requirement per thousand dollars of plant in service at cost. In other words, the burden upon customers to yield 6 per cent in respect to outlays effective from 1926 to 1984 is 6.79 per cent of the cost of plant in existence at any time.

This example forcibly points out the fact that long term calculations are concededly essential in the determination of depreciation expense. The ultimate object of figuring is to ascertain what the customer should properly be required to pay for service.

Let us now compute the effect of the company's claims upon the price requirement. We have a total investment of $1,291,880, and a salvage rendition of $184,770—approxi-

mately 14.5 per cent of the cost. If this salvage is distributed pro rata, the amount allocable to the initial property is 14.5 per cent of $238,000, or $34,510. The total completed depreciation at retirement in the initial property, therefore, is cost less salvage, or $203,490. A life of 37.9 years represents an annual charge of 2.67 per cent, which amounts to $5,392. The profit requirement will be 6 per cent of first cost, and amounts to $14,280. The total requirement for depreciation and return on this basis is therefore $19,572, or approximately 8.2 per cent of cost. As we have seen, however, the actual requirement is 6.79 per cent, a difference of 1.3 per cent.

A requirement of 6.79 per cent for depreciation and return to yield an annual profit of 6 per cent would not be felt as a heavy burden upon customers. Even so, the requirement is overstated. It excludes from consideration any operating advantages of financial significance which will be obtained by enlarging the building. Such savings are indeed part and parcel of the plans for expansion, and are hence as well known to the company as is the cost of the contemplated additions. The charge to depreciation expense is based upon the probable events of the future. The showing is necessarily incomplete which limits the gross detriments which are foreseeable, unrelieved by countervailing benefits which are equally foreseeable.

If the complete picture is shown, the effect in all probability will be that future expenditures will occasion such operating economies that the contemplated additions will not even in the slightest degree, constitute a burden upon present users of service.

4. The Accounting Regulations of the Interstate Commerce Commission are Irrelevant upon the Issue of Confiscation

The Interstate Commerce Commission has given its approval to the straight line method of depreciation accounting. *Depreciation Charges of Telephone and Steam Railroad Companies,* 177 I. C. C. 351. This approval was conditioned upon the fact that all of the theoretical implications of the method, including corresponding write-downs in capital value, were to be pursued. But there is an obvious distinction between accounting requirements and rate prescriptions. The former deal with the allocations of wealth on paper; the latter deal with the price of service. Bookkeeping allocations of wealth can neither enrich nor impoverish, since they have only to do with figures on paper. The Interstate Commerce Commission was not authorized to determine, nor did it undertake in that investigation to ascertain, what price the customer should pay for service. The sole effect of any determination therein made by the Commission is to regulate the amount of income to be reserved. This income is the property of the company, whether it is held in reserve or distributed in the form of dividends; and when there is drawn into question the confiscatory character of rates, wealth is not to be turned into dross merely because it is to be kept in the business continuously earning money, rather than distributed to stockholders. It may, of course, be true that the Interstate Commerce Commission intended that the debits to expense on account of depreciation should be taken as a measure of the actual expense on this score. But is it to be assumed that the Interstate Commerce Commission has the power to lay such a requirement upon this court when this court is engaged in determining the Constitutional measure of property immunity? Obviously, the orders of the Commission do

not even bind the Commission itself in a rate proceeding. They affect only the way in which records should be kept. In a rate case even before the Commission, that tribunal would certainly have the power to interpret and revise the significance of the bookkeeping entries for the purpose of fixing rates.

The distinction here indicated receives recognition in the report of the Commission (See p. 380 thereof).

Valuation depreciation is not reducible to a convenient formula for bookkeeping purposes. (See comments on annuity method, p. 409 ff. of I.C.C. report.)

XI.

GOING VALUE

The occasion to emphasize going concern value as an element arises when it is sought to increase or inflate a particular liquidation of fair value, and it depends upon the claim of insufficiency in respect to the figures already propounded for fair value. The determination of this claim involves consideration of what, in the particular case, has been included in arriving at the fair value quantity.

We have been at some pains to indicate the distinction between the value of an enterprise considered in relation to the existence of a regulatory power to cut down its revenues, and what would be its value in the absence of regulation. The numerous statements in the cases, adduced in support of going value, that a business in actual operation is worth more than one inactive, that a business with customers attached is worth more than one without customers, that a business earning money is worth more than one not earning money, etc., seem for the most part to beg the question at issue. In any case the

value of the enterprise will depend upon earning power; and this is true whether it be a going concern or a quantity of assembled junk. We cannot logically derive value by assuming it. In an unregulated business we can, of course, capitalize the prospective income. But when the income itself may be cut down by regulation we must resolve the basis of the permitted income not by reasoning as to what things may be worth in some abstract sense, but by a consideration of what income may constitute a just compensation for sacrifice.

The thought that "value is value," meaning that it may be discovered as a definite substance held in proprietorship, for which compensation must be allowed, is not at all a fruitful approach to the subject of fair value relative to Constitutional law. It tends to obliterate the distinction between value under the condition of income restricted by law, and value when such restriction does not exist. Such confusion runs through such cases as *National Water Works v. Kansas City,* 62 Fed. 853, and *Omaha v. Omaha Water Co.,* 218 U. S. 180.

Both of these cases involve the valuation of a public utility in view of contemplated purchase by the city. In assuming to value these businesses at what they were worth as going concerns, no distinction was observed in respect to what the value would be if the power to regulate were exerted to the utmost, and what value would attend the business in the absence of regulation. Merely because the services rendered by the enterprise are highly valuable to the customer, in the sense that they are greatly in demand, is not a reason for enlarging the requirement of fair compensation.

Except for the dictum in *McCardle v. Indianapolis Water Co.,* 272 U. S. 400, this court has tested the claim for going value by reference to the requirements of due

compensation. So tested, claims for special going value allowances were rejected in *Cedar Rapids Gas Light Co. v. Cedar Rapids*, 223 U. S. 655, *Des Moines Gas Co. v. Des Moines*, 238 U. S. 153, *Galveston Electric Co. v. Galveston*, 258 U. S. 388, and *Georgia Railway and Power Co. v. Railroad Commission of Georgia*, 262 U. S. 625.

In *Des Moines Gas Co. v. Des Moines*, particular attention was accorded to the element of cost in respect to the organization and establishment of the business; and it was pointed out that while the incurring of such costs ordinarily generates a requirement of compensation, it did not appear that full compensation for these costs had not already been received.[1] That going value allowances should be limited to the requirements of due compensation for sacrifice was especially stressed in *Galveston Electric Co. v. Galveston*, in which the claim for going value measured by the capitalization of past deficits was repudiated.

The measure of compensation when going value is in question is not independent of the rate base standard. Likewise the rate of profit calculated upon the rate base may be such as to have a bearing upon whether or not something more is needed to secure just compensation. A consideration of these relationships is at present excluded. Our desire is to indicate merely the qualitative character of going value.

The conclusion that expenditures properly made in the enterprise are to be compensated for in the determination of compensatory capital value, presents the question as

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[1] In Michigan Public Utilities Commission v. Michigan State Telephone Co., 228 Mich. 658, 677, it was held that the payment of such costs as expense out of current income did not warrant the denial of any allowance at all for going value, since the income was lawfully the money of the company.

to whether the object of these expenditures—the services which they procure—have in the past become spent, or exist in whole or in part at present as a stock of services. For the sake of definiteness let us have in mind specifically the cost of training help and attaching customers, that is to say, money spent for advertising, soliciting, making and keeping customer records. Such expenditures are universally charged to current expense. The utility, having demanded that such expenditures be regarded as current for purposes of computing profits during any accounting period, is in very poor position to urge that they result in capital value appreciation. Now the writer would not deny that under refined and proper methods of accounting such expeditures are really in part chargeable to capital rather than to revenue. When a customer is acquired and a record of transactions with him is initiated, no doubt the expenditure incurred should properly be distributed over the total income to be received from the particular customer. Now the value of that expenditure is by no means a permanent and durable capital gain. It is continuously being expended as the customer uses service; and if the customer comes and goes entirely within the accounting period, then the cost of soliciting him and keeping records for him is completely an expense of the current accounting period. It becomes a matter of great difficulty, therefore, to distribute between accounting periods, with a high degree of refinement, the amount of value consumption in respect to the cost of attaching customers, which occurs in each accounting period. For this reason it has been deemed most convenient to charge such expenditures to the expense of the current period.

Now it is possible, by a special study, to distribute irregular expenditures as general burdens upon all of

the users of service. The valuation tables dealing with varying annual income aptly demonstrate how this may be done. But it will be seen that under proper distribution of such irregular expenditure, the burden will be equitably distributed to the total output. The question properly to be considered is, therefore, what is the effect of the expenditures incurred for advertising, for training help, and for keeping customer records on the price requirement per unit of service? To assume that every cent spent up to date for such purposes shall be a burden upon the future demands of the present and future customers, is to assume something of manifest absurdity. This, in effect, however, is what the company claims.

Worse still, the claim is that expenditures charged as expenses in the current accounting periods of the past, was not really so, but they become cumulatively the capital value of the present.

It has been a customary procedure of the company to make a showing in behalf of going value at a remote date, say 1923, apparently based upon claimed expenses, to convert this into a percentage relationship to the reproduction costs of the physical elements, and then to argue that the result, namely going value, keeps on growing as the plant itself and its reproduction cost increases, so that it is always a constant per cent of the fair value, reproduction cost basis, of the physical elements. Such slap-dash accountancy should defeat its own ends. Nevertheless, it appears that the statutory court sanctioned the general theory of the company, modifying the claim of 15 per cent to an allowance of 8.

Correct accountancy will distribute the burden of all such costs in the form of an equal burden upon the price per unit of service. We have indicated the general mode of making such distributions, and the theory basic there-

to. However, such expenditures are more or less continuous, and in all probability a careful distribution thereof will not substantially alter the result obtained by charging such expense against the revenues of the current year. The degree of irregularity itself is too small, and the amounts involved are too small, for the particular refinement which should be the basis of the plaintiff's proofs to have a substantial effect upon the proper price per unit of service.

Moreover, as presented, the company's claim is duplicitous. Regarding the calculations of the test year, we see that current expenditures for training help and attaching customers are taken as a measure of annual expense burdens upon customers. If these expenditures are capital charges, composing an increased going value of the future, they cannot be allowed as current expense. This vice extends, we think, to all test calculations from 1923 to date.

We therefore conclude that the plaintiff's proofs do not establish a fair and proper basis for allocating to the present fair value a proper portion of the cost of training employees, acquiring customers and keeping customer records.

Going Value and Varying Use of Capacity

Utilities persistently advance a claim for going value arising out of alleged deficiency of income in the so-called development period of the business. A claim of this sort was repudiated in the *Galveston* case, *supra*, on the ground that deficits could not constitute evidence of capital value. By the exercise of more than a little imagination the same claim appears in new garments as part of the telephone company's paraphenalia of securing rate increases. Since the attempt to capitalize

actual deficits in a real business had failed of its object, it was evidently thought that a more persuasive appeal could be made by attempting to capitalize the hypothetical deficits of a purely imaginary business. Accordingly, an expert was called upon to give testimony that if the business were to be reproduced the construction would march somewhat ahead of the customers, so that during the construction period there would be considerable idle plant and considerable employed but non-productive numbers of operatives. All this, it is claimed, signifies a deficit in income which ought to be capitalized under the guise of going value. This claim is made in this record by Sloan (O. R. II, 709-747).

A presented by this record the claim itself consists of general and indefinite conclusions unsupported by specific facts. It may be regarded as too vague to merit consideration. The claim, however, is known to the writer in its best possible form, and in such form is involved in the Michigan case.

It is true that plant development in an actual public utility enterprise proceeds in advance of the acquisition of the customer. A growing plant will have, as we have previously pointed out, a margin of unused capacity. This condition actually existed in the development of every enterprise. But the claim for rates made by the utility was, in fact, based upon the theory that the existing customers, making only a partial use of the plant, should pay rates as if the plant were fully used. The company's plant in this case has during each year in question a considerable margin of excess capacity, yet we find that for each year the existing customers are supposed to furnish an income equal to capacity returns, and this figured under the company's method of computing it. At bottom there is involved an erroneous dis-

tribution of the burden of capital costs, coupled with a similarly erroneous distribution of the profit requirement burden.

Everything which we have said concerning the proper distribution of an irregular expense is applicable to the distribution of capital costs to the output to which such costs contribute. The assumption of a standard revenue per dollar of investment each and every year is a serious fallacy. Once it is made it draws a train of subsidiary, entangling errors which completely prevent straight thought. In the valuation tables which we have presented, the questions here involved are implicitely considered, accounted for and determined. We must, however, specially direct attention to these elements from the present point of view. If we regard Table II, we note that the income requirement under considerations of constant output, in view of the basic assumptions made, is undeniably $135.87 per annum. This amount covers depreciation and return, the correct analysis of which appears in Table III. Now the assumption of equal annual revenue is only justifiable when output is constant. The particular mutations of value there shown depend upon the factors of constant output and of constant annual expenditure. If even the latter element is varied by the condition in which irregular expenditure is foreseeable, then specific modifications in the capital values are necessarily caused. This is illustrated in Table IV. But if output alone, and consequently revenues, are constantly increasing as shown in Table V, another special effect upon depreciation and capital value results. Table V is to be compared with Table III. The only difference between them is that in one the income is constant and in the other it increases in pace with output. There is nothing standard about the income requirement. If plant having the same cost when the output is 50 per cent of capacity yields an in-

come of $82,68, there is no deficiency whatsoever. To be sure, some modification in the price requirement per unit of service is necessary as between the two examples. A higher price per unit must be demanded under the conditions of varying output than would be proper when output is constant. The difference is due to the element of time.

A proper price per unit of service in view of all costs, including unequal annual expenditures, and likewise according consideration to the element of varying output, is fully compensatory and includes everything meritorious in the claim for going value based upon the failure to reach capacity revenues immediately.

When a business which requires a large capital investment is initiated, its customer development is relatively small. Yet the usual forms of financial accounting create the impression that, of necessity, a loss must be taken in the early years. This apparent loss must be countered by a restorative gain when capacity demands swing into play. It is this condition which naturally prompts the thought of going value. It is purely the result of delusive accountancy.

The major delusion is the belief in a constant rate of depreciation. Since this constant amount is subtracted from the meager income of the early years, only a little of so-called profit is left. But it should be recognized that there are, so to speak, appreciative factors at work. The prospective large incomes from capacity use are constantly drawing closer to realization, and in considering the actual depreciation, the effect of time relative to the distribution of income must be reckoned with. Indeed, in properties under development it soon becomes recognized that the assumption concerning depreciation in

the early years as usually made was erroneous, and an honest attempt is made to counteract it by stressing the so-called element of going value. The simple truth of the matter, however, is that the property did not depreciate at the assumed rate and no "going value" was needed to restore the merely imaginary loss.

Sometimes the balance between appreciative and depreciative factors runs in favor of the former. The degree of deferred use may be such that positive appreciation results. A building under construction must appreciate at least to the extent of interest or the venture is misconceived. In a like manner unused land tends to appreciate as the time of income rendition draws nearer.

In conclusion it may be said that any presentation of evidence to support the claim of confiscation is fatally defective unless there is shown that the price per unit of service in view of output, present and prospective, is too low. A determination of the proper price per unit of service will include all necessary consideration of "going value,"—or, put in other words, will dispense with considering it.

XII.

THE RATE BASE

We have concentrated attention upon the development of principles which are applicable to any rate base figure, no matter how derived. We contend that these principles are so essentially involved in testing the claim of confiscation that a plaintiff's presentation which ignores them must necessarily fail of its object. Before a rate base for the purpose of this case can be determined, profits realized in related corporations must be ascertained,

and values must be apportioned between interstate and intrastate uses. This record does not progress far enough to warrant a decision upon the proper measure of the rate base.

So much has been written upon the subject of the rate base that it is difficult to add a constructive word. We shall therefore limit ourselves to a mere observation designed only to round out somewhat the general picture which we present.

If the basic starting point for ascertaining fair value is the cost prudently incurred of existing assets, (a figure which may be modified for depreciation) it will be found that the Constitution will have become an instrument to permit and protect a process of value increase by continuous compounding at rates deemed to be reasonable.

If it is right to assume that when rates are tested a reasonable profit on cost prudently incurred should be accorded, then this right should properly be considered to have a continuous existence and a constant application. Does the Constitution afford a guarantee, subject only to the value of service qualification, that wealth at cost left to function in a business will continuously increase by compounding? Practical business experience will advise that the continuous compounding of wealth at rates heretofore considered to be constitutionally required is, for business in general, impossible. The process itself is exemplified in large scale businesses during so-called periods of expansion, and is self-limiting. Doubtless the apparent prosperity itself creates a wide range of socially uneconomical demands which are undependable in themselves and are likewise exhaustive of purchasing power. In competitive businesses the increase of wealth by geometrical progression comes to a halt, and values decline sharply to

a point which permits the process to start over again. It follows that the right to continuous earnings upon cost ought not to be conceded by the Constitution.

The concept of present value was developed to offer a corrective for this condition. It wholly fails of attaining this objective under present conditions of production and commercial organization. The main reason for this failure is to be found in the special conditions pertaining to goods used in the production of public utility services.

Such goods are not at any time produced so as to form market stocks. There is never an impelling pressure upon manufacturers to produce. In a period of depression such goods are substantially off the market.

It would be impossible sensibly to appraise the great bulk of public utility properties today upon the basis of reproduction costs. The inquiry would be thrown back to the hypothetical question of what it would cost to produce the goods themselves. The question may be asked: In what quantities? This is indeed the stumbling block. If we may imagine a particular utility in process of reproduction, why not imagine all other utilities in the same condition? Clearly, the hypothesis will have changed the economic conditions of the country. On the other hand, to produce only a limited quantity of goods at a profit will be to burden them with the total constant overhead cost involved in operating the factory and servicing a dormant business. It might even be found that wage rates have not officially dropped. As a result plausible estimates could be made to show that reproduction cost of most of the plant items would today be much higher than at any time in history.

A business which has been able to pay liberal dividends and also to keep invested a substantial balance of income

(reserves and surpluses) will show a considerable amount of what is commonly called reinvested profit. Commonly the business world does not value this so-called reinvested profit at face. Earnings plowed back do not appear to be worth as much as earnings paid out in dividends. It is realized that the continuous nurturing of the business is a condition of the dividends themselves, and that a profit determination at a particular point of time is highly contingent. Up to a certain point surpluses and reserves are regarded not as profit but as provision for value recession which is commonly considered almost certain to happen.

We would apply this principle in some degree to the regulation of public utility rates. A community of interest between rate payers of different years, and even of different economic periods, should be recognized. The question of what is a reasonable rate should be resolved upon consideration of a proper balance between the price at which the utility can afford to sell service and that which will accord to the public a reasonable access to the service at a price which is not felt to be too onerous. The fact that the invested capital at the cost standard has been greatly increased through past earnings ought to be of some weight in determining the price at which a utility can afford to sell service in a period of depression. And what the public can afford to pay should likewise be material.

In our view a rate base formula does not, under present conditions, serve a useful purpose. In any view of the matter the rate base should provide a measure of the stockholders' equity in the business. This sum will consist of the total fair value of the property, less the indebtedness against it. But a present appraisement of property values upon any standard could not command

general assent. Its final result will appear, tested by common sense judgment, to be too high. We suggest that the dominating consideration in rate making today is the ability of the public to stand the burden. The opinion of the Public Service Commission of Wisconsin, rendered June 30, 1932, in *Re Wisconsin Telephone Company,* P.U.R. 1932 D, 173, recites cogent economic considerations bearing upon the comparative burden of public utility rates upon the cost of living. To us, such considerations seem more important today than mathematical calculations. At the same time there should be considered the financial position of the utility itself and the effect of such hypothetical rates upon the conduct of the business. Clearly, if they are sufficient to meet current obligations and to pay, if not the customary dividend, at least a substantial amount, the claim of confiscation should be denied.

XIII.

RATE OF PROFIT

There exists no standard rate of value productivity. It is impossible to know that a dollars' worth of goods at cost devoted to productive purposes in the arts will produce increase of wealth. Such increases which actually take place are extremely irregular from time to time; and commercial losses are enormous.[1] Nevertheless there are people prepared to estimate profit possibilities and to expend money upon the hope that their estimates will not prove disappointing. They value the income prospect, definite or indefinite in their minds, in terms of precise present figures. The prospective profit realization on

[1] See Foster and Catching's "Profits," pp. 108 and ff.

dollars already invested cannot, of course, be affected by such estimates; but they do, however, have the effect of revaluing capital goods and thus modifying the rate of profit by changing its base. Such valuations are, however, indexes of expected profit returns in relation to sacrifices of present money.

Common stock prices can afford only a meager index to the profit expectation, since usually no means are at hand to define the estimate of income. Such expectations may be well defined in the mind of the prudent, but its form, or time shape, will vary greatly among individuals. Many others will be prepared to gamble on merely vague intimations. Only where the income expectation is defined, as in loans, is it possible to ascertain the expectation of a rate of profit upon present value. The market rate of interest on loans is therefore the only basic standard of reference from which an idea of a compensatory rate of profit may be derived. But it is maintained that we should select 38 of the most fortunate corporate enterprises and be advised concerning compensatory rates from their experience. But except as such experience has, in fact, modified market rates of interest, it is irrelevant. The advent of fortunate chance is no indication of a minimum profit to provide compensation for sacrifices.

It is likewise a vain pursuit to assume the non-existence of an enterprise and then to imagine what returns must be offered to call forth investment. Facts are not usually proved by fictions. Any new business, real or imaginary, is ordinarily considered a speculative venture. It is erroneous to impute a continuous speculative character to an established business by the process of imagining it being continually established anew.

A particular business is attended with unique factors of safety and of risk. It is almost impossible to subject it to ready comparison with some other business. It is therefore most convenient to apply general judgment to the business under regard, and to attempt to arrive directly at an opinion concerning the compensatory rate of profit. A good starting point in this endeavor is to first ascertain the market riskless rate of interest. This rate will fluctuate in accordance with economic conditions. At the present time it would be somewhat difficult to discover it. Likewise, the peculiar conditions of the present will cause a great difference between the short time rate and the long term rate.

It may be conceded that this or any business is subject to some degree of risk, but the present conditions of panic ought not to be available to measure it. Likewise the special conditions of prosperity and expansion will properly indicate a rate of return greater than is presently necessary to avoid the charge of confiscation. Again we say that the most convenient, practical test to apply today in a close case is the sufficiency of present and prospective revenues to meet interest obligations and to provide substantial dividends. As was said with reference to the rate base, it would be difficult to obtain general assent to any figure for a rate of profit produced as a result of calculation, and almost any such figure would to ordinary common sense be considered too high.

Let us consider the extent of risk in this business:

1. *The risk of competition.* This may be briefly dismissed. The size of the business, its monopolistic character, and the interrelation of its divisions makes it unthinkable that substantial competition can be offered in either the manufacturing or research field, in which alone

competition may be regarded as hypothetically possible. Telegraphic communication is diminishing. It makes considerable use of telephone lines.

2. *The risk of substitute services.* The measure of possible wireless competition has already been taken. It is auxiliary rather than competitive. The probabilities of its further development favor increased use of the telephone.

3. *The risk of fluctuations in demand.* A certain level of demand is highly dependable, but as the use of telephone service expands, the demand becomes more elastic. This risk is to a great extent measurable and protection against it may be directly accorded in rates based upon the relation of present use to average. The company allows—indeed induces—courts to assume that present use is at capacity, and thus fails to reveal the favorable chance of expanding use.

This risk is reduced by advertising, customer good will, and low charges. It is enhanced by burdensome bills and rate contests.

4. *Inefficient conduct of business.* This risk is reduced to lowest terms by means of scientific systematization obtained at considerable cost which is charged to operating, development, and supervising expense.

5. *Risk of labor troubles.* This risk is reduced to a minimum through the benefit and pension plan, and the employees' stock ownership plan. Very few businesses are so free of labor troubles.

6. *Risk of structural and operating defects.* This risk is largely eliminated by research and standardization at considerable expense.

7. *Risk of depreciation.* This, we have shown, does not exist.

8. *Risk of casualties and storm damage.* This risk exists and rates must afford protection against it. Its burden is very slight.

9. *Risk of adverse regulation.* This is an investor's gamble. The law cannot admit its failure to afford adequate protection.

A general word may be said concerning risk: it is the effect of uncertainty. Whatever diminishes uncertainty minimizes risk. To a large extent uncertainties can be reduced through incurring expense, and this expedient is greatly favored in the Bell System. As a result of this policy, and of the especially favorable investment opportunity subject to exploitation, the American Telephone and Telegraph Company is as near being a riskless business as is imaginable for a commercial enterprise.

Borrowing large parts of the capital needed to conduct business is, of course, a mode of distributing risk. The expense entailed by interest payments is one proper to constitute a burden upon rates. By this means the borrowed capital can be exactly compensated for, through rates. In a public utility such as the Bell System, the risk upon stockholders is not appreciably increased by borrowing. The general risk is too small for stockholders to be substantially affected by bearing all of it.

The favorable chances for the enhancement of stockholders' profits must not be overlooked. Any tentative rate of profit expectation which may be incorporated in rates is almost certain to be bettered by the eventualities. Opportunities exist in this direction—that of cost reduction, and that of revenue expansion.

It is confidently asserted that the application of the accounting principles heretofore expounded for the determination of profit, depreciation expense, revenue requirements in view of limited use, and the distribution of expense and values between the various activities, will result in both a rate base and a rate of profit impressively high. The case will not be close enough to require a determination of fair value and the rate of profit necessary to avoid the charge of confiscation.

XIV.

CONCLUSION

This brief has been filed for the purpose of demonstrating the fallacies contained in the usual calculations brought forward to support the claim of confiscation. We are concerned not with attempting to lay down principles of general application, but rather in setting forth those applicable to the telephone business as it is conducted by the American Telephone and Telegraph Company. We brand as fallacious the proposition that an income requirement can be computed directly from the premise of invested capital value. Regard must be had for the facts of output determined by the technological conditions of production, and the expansion and recession of demand. These conditions will likewise constitute factors determinative of annual expenses, particularly the expense of depreciation. We show that, as Justice Holmes so well emphasized, a business is a course of conduct. We indicate the bearing of this conduct and the results which it accomplishes upon the troublesome subject of depreciation expense. We ask the court to allow scope for the application of the principles which we expound to the decision of

this case and to the decision of the pending cases in Michigan.

Respectfully submitted,

HAROLD GOODMAN,
Special Assistant Attorney
General, State of Michigan.

Dated at Detroit this 4th day
of January, 1934.

PATRICK H. O'BRIEN,
Attorney General,
State of Michigan.

HAROLD GOODMAN,
Special Assistant Attorney General,
State of Michigan.

FILE COPY

IN THE

Supreme Court of the United States

OCTOBER TERM, 1933.

No. 440.

BENJAMIN F. LINDHEIMER AND OTHERS, CONSTITUTING THE ILLINOIS COMMERCE COMMISSION OF THE STATE OF ILLINOIS; OTTO KERNER, ATTORNEY GENERAL OF THE STATE OF ILLINOIS, AND THE CITY OF CHICAGO, *Appellants*,

vs.

ILLINOIS BELL TELEPHONE COMPANY.

No. 548.

ILLINOIS BELL TELEPHONE COMPANY, *Appellant*,

vs.

BENJAMIN F. LINDHEIMER AND OTHERS, CONSTITUTING THE ILLINOIS COMMERCE COMMISSION OF THE STATE OF ILLINOIS; OTTO KERNER, ATTORNEY GENERAL OF THE STATE OF ILLINOIS, AND THE CITY OF CHICAGO.

STATEMENT FILED PURSUANT TO DIRECTION OF CHIEF JUSTICE.

Return on Book Cost of Property of Plaintiff.

In Finding of Fact No. 4 (R. III, 2515) the District Court found that the original or book cost of plaintiff's property

is correctly stated in plaintiff's Exhibit A-54. Exhibit A-54 (R. IV, 2757-2765) contains a sheet for each of the years 1923 to 1931, inclusive. The following statement of average book cost is the figure shown in line 18 of this exhibit for each of the years for the total intrastate property in the Chicago area. This figure represents the average book cost of the plant in service and general equipment, construction work in progress, materials and supplies, and working cash capital for each such year. It contains no element for overheads omitted from plaintiff's books (Order of Commission, O. R. I, 23) nor for going value. The 1931 figure is used for 1932 in the following computation.

The amount available for return is taken from the District Court's Finding of Fact No. 30 (R. III, 2521). This finding sets out the amounts available for return for each of the years 1923 to 1932, which plaintiff would have earned on its intrastate business under the rates imposed by the order of the Commission here under attack.

TOTAL INTRASTATE BUSINESS.

	Average Book Cost for Year	Amount Found by Court Available for Return Under Rates in Suit	Per Cent Return
1923	$95,074,135	$5,104,515	5.4%
1924	105,291,980	5,932,959	5.6
1925	117,730,536	6,297,890	5.3
1926	130,857,353	6,402,128	4.9
1927	146,173,197	6,686,503	4.6
1928	159,622,212	6,914,459	4.3
1929	168,988,816	8,939,602	5.3
1930	178,157,620	8,492,385	4.8
1931	181,925,963	8,392,555	4.6
1932	181,925,963	6,750,000	3.7

Respectfully submitted,

CHARLES M. BRACELEN,
WILLIAM H. THOMPSON,
Counsel for Illinois Bell Telephone Company.

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IN THE

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OCTOBER TERM, 1933.

No. 440.

BENJAMIN F. LINDHEIMER AND OTHERS, CONSTITUTING THE ILLINOIS COMMERCE COMMISSION OF THE STATE OF ILLINOIS; OTTO KERNER, ATTORNEY GENERAL OF THE STATE OF ILLINOIS, AND THE CITY OF CHICAGO, *Appellants*,

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BENJAMIN F. LINDHEIMER AND OTHERS, CONSTITUTING THE ILLINOIS COMMERCE COMMISSION OF THE STATE OF ILLINOIS; OTTO KERNER, ATTORNEY GENERAL OF THE STATE OF ILLINOIS, AND THE CITY OF CHICAGO.

APPELLANTS' MODIFICATION OF APPELLEE'S STATEMENT FILED PURSUANT TO DIRECTION OF CHIEF JUSTICE.

Return on Book Cost of Property of Appellee Giving Effect to the Deduction of Depreciation Reserve Resulting From the District Court's Findings on Expense of Depreciation.

TOTAL INTRASTATE BUSINESS.

Year (a)	Average Book Cost for Year (Taken from Appellee's Statement) (b)	Average Book Depreciation Reserve Based on District Court's Finding of Depreciation Expense (Taken from Column (2) second table page 87, Appendix to Appellants' Brief and Argument) (c)	Average Book Cost Less Depreciation Reserve (Column b Minus Column c) (d)	Amount Found by District Court Available for Return Under Rates in Suit (Taken from Appellee's Statement) (e)	Per Cent Return (Col. (e) Divided by Col. (d)) (f)
1923....	$ 95,074,135	$26,443,943	$ 68,630,192	$5,104,515	7.44%
1924....	105,291,980	29,022,592	76,269,388	5,932,959	7.78
1925....	117,730,536	31,636,847	86,093,689	6,297,890	7.32
1926....	130,857,355	34,725,816	96,131,539	6,402,128	6.66
1927....	146,173,197	38,323,830	107,849,367	6,686,503	6.20
1928....	159,622,212	41,459,891	118,162,321	6,914,459	5.85
1929....	168,988,816	42,698,444	126,290,372	8,939,602	7.08
1930....	178,157,620	43,473,376	134,684,244	8,492,385	6.31
1931....	181,925,963	45,232,272	136,693,691	8,392,555	6.14
1932....	181,925,963	45,232,272	136,693,691	6,750,000	4.94

Respectfully submitted,

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Counsel for Appellants in Case No. 440, and for Cross-Appellees in Case Number 548.

FILE COPY

Office Supreme Court, U. S.
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OCT 25 1933
CHARLES ELMORE CROPLEY
CLERK

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1933

No. 548

ILLINOIS BELL TELEPHONE COMPANY, APPELLANT,

vs.

BENJAMIN F. LINDHEIMER AND OTHERS, CONSTITUTING THE ILLINOIS COMMERCE COMMISSION OF THE STATE OF ILLINOIS; OTTO KERNER, ATTORNEY GENERAL OF THE STATE OF ILLINOIS, AND THE CITY OF CHICAGO.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF ILLINOIS.

STATEMENT AS TO JURISDICTION.

CHARLES M. BRACELEN,
WILLIAM H. THOMPSON,
EDWARD L. BLACKMAN,
KENNETH F. BURGESS,
LESLIE N. JONES,
Counsel for Appellant.

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support of the jurisdiction of that Court on plaintiff's cross-appeal in the cause herein, respectfully states:

I.

The statutory provision believed to sustain the jurisdiction of the United States Supreme Court on plaintiff's cross-appeal herein is Section 266 of the Judicial Code as amended (28 U. S. C., Sec. 380), which authorizes direct appeals from this Court to the Supreme Court of the United States in causes having the character of this cause.

II.

The case involves the validity of the order of the Commerce Commission of the State of Illinois dated August 16, 1923, prescribing certain rates and charges for telephone service in the City of Chicago, Illinois, a copy of which order is attached to the bill of complaint herein as Exhibit A.

III.

The date of the decree in this cause sought to be reviewed is June 28, 1933, and the date upon which the application for plaintiff's cross-appeal is presented is September 26, 1933.

IV.

The following is the nature of the case out of which plaintiff's cross-appeal arose: Plaintiff's bill of complaint in this Court sought to restrain the Illinois Commerce Commission and the Attorney General of Illinois from enforcing against plaintiff certain rates for telephone service in the City of Chicago, which rates were prescribed by the order of said Commission referred to in paragraph II hereof. The Bill alleged that the rates so fixed did not afford a fair return upon plaintiff's property used and use-

ful in furnishing the service covered by said order, and that said rates were confiscatory, in violation of the Fourteenth Amendment to the Constitution of the United States. The final decree and judgment entered herein granted plaintiff the injunction prayed for, and from said decree and judgment defendants have appealed to the United States Supreme Court.

While this Court has granted plaintiff the injunction prayed for, certain issues necessary to the decision of the case, particularly with respect to the fair value of the property, the reasonable and proper operating expenses, and the fair rate of return, as specifically set forth in plaintiff's assignment of errors presented and filed herewith, were decided adversely to the contentions of plaintiff. Plaintiff seeks the correction of these errors.

This cross-appeal by plaintiff to the United States Supreme Court is taken:

(1) In order that in any subsequent actions between the parties hereto the plea that plaintiff is estopped by the decree and judgment with respect to said matters may not be maintained.

(2) In order that plaintiff, as a matter of right, may urge said errors of this Court in opposition to the appeal of the defendants and in support of this Court's decree, wherein the relief sought by plaintiff was granted.

V.

The cases thought to sustain the jurisdiction of the United States Supreme Court on plaintiff's cross-appeal are:

As to the first ground set forth in paragraph IV hereof:

New York & Richmond Gas Co. v. *Prendergast* (1925), 10 Fed. (2d) 167, 208 (D. C. N. Y.); *Van Wert Gaslight Co.*

v. *Public Utilities Commission of Ohio* (1924), 299 Fed. 670, 675 (D. C. Ohio). See, also, *City of Houston* v. *Southwestern Bell Telephone Company* (1922), 259 U. S. 318. But cf. *Harding* v. *Federal National Bank* (1929), 31 Fed. (2d) 914, 918, 919 (C. C. A., 1st Circuit).

As to the second ground set forth in paragraph IV hereof:

Bolles v. *Outing Co.* (1899), 175 U. S. 262, 268; *Warner Co.* v. *Pier Co.* (1928), 278 U. S. 85, 91; *United States* v. *Ten Cases, more or less, Bred Spred* (1931), 49 Fed. (2d) 87, 89 (C. C. A., 8th Circuit). See, also, *United Railways* v. *West* (1930), 280 U. S. 234, 253. But cf. *United States* v. *American Railway Express Co.* (1924), 265 U. S. 425, 435, 436; *Langnes* v. *Green* (1931), 282 U. S. 531, 538; *Story Parchment Paper Co.* v. *Paterson Co.* (1931), 282 U. S. 555, 560.

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